

# Space News Roundup

Vol. 26 No. 1

January 9, 1987

National Aeronautics and Space Administration



GDSI Inc. contract employees John Bunch, foreground, and Charlie Stone, standing, work in the Bldg. 17 switchroom where computers process calls handled by the new Rolm telephone system. The switchroom is in the largest of four telecommunication nodes scattered throughout JSC.

## Telephone system clears two hurdles; more to go

The first two major hurdles of switching to the new Rolm telephone system have been easily cleared, and Clyde Waters, JSC's Manager of Center Telecommunications Systems, is pleased with the positive reception from employees.

Voice communications cutover was completed at 6 p.m. December 19. Although intense planning for the cutovers began eight months ago, the voice cutover was 90 percent complete in less than four hours. Ninety-five percent of the computer ports and 75 percent of the workstations using asynchronous data made the cutover by 4 p.m. January 2.

Several other milestones remain, but Waters said an optimistic estimate is that the new system will be fully operational and the old system removed by April 30.

"I'm very pleased because JSC's response to this has been very different from many other installations," Waters said. "In other areas they've had problems and they've faulted the systems. But here, it seems as though our people have said, 'Hey, we like this.'

"From a Center standpoint, our people are progressive. I think they live in a progressive community. I think that as a whole they think progressively. They think positively, and you offer them a new capability and they recognize the advantages of it, they like it, and they use it."

Ron Berry, Director of Mission Support, said he, too, is pleased with the new system's performance so far and happy that the cutover went smoothly.

"We think it's going to provide a significant increase in functionality and convenience, and that it will be well worth going through any initial difficulties," said Berry.

Teams from Rolm, Southwestern Bell and AT&T worked with JSC employees during the eight months of intensive planning that preceded the cutover.

"It has been one of the most cooperative working arrangements that we've experienced. I think it is attributable to the people who worked with us from AT&T, Southwestern Bell and Rolm.

"Even with the *Challenger* incident Southwestern Bell — without our requesting it — moved in and set up to accommodate this Center's unusual workload even after they knew they had lost the support services effort," said Waters. "This is the kind of cooperative spirit that I saw from these people."

Hank Sparks, Rolm's NASA Branch Manager, said the JSC installation is its largest ever of this complexity. Getting acquainted with government procedures, documentation, security and safety requirements was a big job, he said, and JSC coordinators drove Rolm's staff hard.

"Their cooperation, assistance and guidance is what helped us make the scheduled cutover," Sparks said. "For the size of the system, it was the smoothest cutover we've achieved."

Waters said there were minor hitches in the cutover — such as when the old 3111 Center information number was given to the Plant Engineering Division Construction

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## NASA FY88 Budget is \$9.5 billion

President Reagan has requested \$9.5 billion in funding for NASA in Fiscal Year 1988, a budget which includes \$3.7 billion for the Space Transportation System and \$767 million for the Space Station.

"On a comparable basis," NASA Administrator James C. Fletcher said in announcing the budget Jan. 5, "this represents a modest increase in real terms over the \$10.5 billion in our FY 1987 operating plan, which includes \$2.1 billion to fully fund a replacement orbiter for *Challenger*."

The budget also includes authority for NASA to add 625 people to

the Agency's Civil Service workforce, bringing the authorized complement to 22,425.

Another feature of the budget is authorization for JSC to proceed with construction of a \$15.8 million addition to the Mission Control Center and a \$3.4 million addition to the Bldg. 5 simulator and training facility.

The four-story addition to Bldg. 30 is planned for construction in FY 1988, housing a "mission control center" for Space Station. The 90,000-square-foot addition to the southwest corner of the existing

Mission Operations Wing of Bldg. 30 will be called the Space Station Support Center. The central control room and related support facilities are designed to support around-the-clock Space Station operations beginning with the Station assembly phase.

The addition to Bldg. 5 will accommodate Space Station simulators and trainers and other support equipment. The multi-story addition will be approximately 16,800 square feet of new floor space and will supplement the existing 9,000-square-foot high bay area of Bldg. 5. Plans call for

completion of the Bldg. 5 project in early 1989.

Fletcher said the funding for Shuttle includes money "to continue activities to correct defects in the solid rocket booster and to improve other elements of the STS; to conduct flight missions; to continue implementation of the Rogers Commission recommendations; to do work necessary to procure upper stages for Shuttle-launched science missions and for other activities."

The \$767 million requested for Space Station will provide for the phased build-up of developmental activities consistent with the pro-

gram review undertaken in 1986, Fletcher said.

The \$1.5 billion requested for space science and applications includes \$25 million for initiation of U.S. involvement with the Japanese and Europeans in the Global Geospace Science Mission.

The mission will use a series of spacecraft, beginning in 1992 and operating through the decade, to study the physics of Earth's magnetosphere and solar-terrestrial relationships. "The United States' contribution will mark its full participation in the International Solar

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## Weitz named deputy director

Veteran astronaut Paul J. Weitz was named Deputy Director of JSC Dec. 31.

Weitz had been serving as technical assistant to JSC Director Aaron Cohen since October 1986.

He is one of 19 astronauts selected by NASA in April 1966. He served as pilot on Skylab 2, the first manned Skylab mission, in 1973 and logged 672 hours aboard the orbital workshop.

In 1983, he was Commander for STS-6 on the maiden voyage of *Challenger*. With the completion of that flight, Weitz had logged 793 hours in space.

He graduated from Harborcreek High School in Harborcreek, Pennsylvania, and received a bachelor of science degree in aeronautical engineering from Pennsylvania State University in 1954. He received a

master's degree in aeronautical engineering from the U.S. Naval Postgraduate School in Monterey, California in 1964.

Weitz earned his commission as an Ensign in the U.S. Navy through the Naval ROTC program at Penn State and served for one year at sea aboard a destroyer before going into flight training. He earned his wings in September 1956 and served in various naval squadrons until he was selected as an astronaut in 1966. He has logged 7,300 hours of flying time, 6,000 hours of that in jet aircraft.

He is the recipient of numerous honors and awards, including the NASA Distinguished Service Medal, the Navy Distinguished Service Medal, the Commendation Medal for combat flights in Vietnam, the



Paul J. Weitz

Robert J. Collier Trophy for 1973, and the Robert H. Goddard Memorial Trophy for 1975.

## Six ELV launches planned for 1987

NASA plans six launches during 1987 using the Atlas Centaur, Delta and Scout expendable launch vehicles.

Two missions are scheduled for February.

The first launch, scheduled for Feb. 19, is a GOES-H weather satellite aboard Delta 179 for the National Oceanic and Atmospheric Administration (NOAA). GOES-H will become GOES-East in orbit and be stationed over the Atlantic Ocean. The single GOES satellite now in orbit will be shifted to cover the Pacific region, becoming GOES-West.

The Fleet Satellite Communica-

tions (FLTSATCOM) F-6 spacecraft also is scheduled for a February launch on the 26th aboard Atlas Centaur 67. This FLTSATCOM will be a continuation of a launch program to place a set of three second generation communications satellites into orbit for the Navy. The first of this series was launched in December 1986. The FLTSATCOM satellites are also shared with the Air Force and other Department of Defense users.

On March 19, Delta 182 is scheduled to place Palapa B2-P into orbit for the government of

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## Space News Briefs

### Burton Edelson to leave NASA

Dr. Burton I. Edelson, Associate Administrator for Space Science and Applications, plans to leave the agency early this spring. Administrator James C. Fletcher asked Edelson to remain until the budget cycle, including Congressional hearings, is complete. Edelson joined NASA in his current capacity in February 1982. Prior to joining the agency, he spent 14 years with the Communications Satellite Corp., rising to senior vice president. Before joining COMSAT, he served 20 years as a commissioned officer in the Navy. During his NASA career, Edelson was responsible for integrating Space Science and Space Applications programs. He guided planning and development of Spacelab missions, development of the Hubble Space Telescope, the flight of the Infrared Astronomy Satellite, the successful encounter of Voyager 2 with Uranus, and coordinated the U.S. contribution to Comet Halley missions.

### Fairchild receives TOPEX contract

The Jet Propulsion Laboratory has selected Fairchild Space Company for negotiations leading to a contract to build a satellite for the Ocean Topography Experiment (TOPEX) scheduled for launch in 1991. The proposed mission, called Topex/Poseidon, would be launched by an Ariane vehicle provided by France's space agency, CNES. NASA and CNES each would provide sensors and share the science data from the satellite. The contract's dollar value will be established during negotiations expected to be completed by May 1987. The contract will run through 1994. TOPEX is designed to measure the sea level of the oceans with sufficient accuracy and over a period long enough to determine the general circulation and surface features of the oceans. Such information is crucial to understanding the role of oceans in climate changes.

### ESA inaugurates Large Space Simulator

Europe's new Large Space Simulator (LSS) will be formally inaugurated January 14 at the European Space Agency's (ESA) European Space Research and Technology Center in Noordwijk, The Netherlands. The first test object, the Italian Research Interim Stage (IRIS), will receive structural and thermal tests under the LSS's high-power artificial Sun. Switching on the artificial Sun, which provides a horizontal beam six meters in diameter by directing 19 Xenon lamp modules at a large collimation mirror, is the occasion for the inauguration. Dr. Rudolf W. de Korte, Deputy Prime Minister and Minister of Economic Affairs, The Netherlands, will officiate at the ceremony.

## Bulletin Board

### Seminars to include AGU report

A report on the fall meeting of the American Geophysical Union is one of several sessions planned in coming weeks for the JSC Astronomy Brown Bag seminar series. The seminars are held each Wednesday from noon to 1 p.m. in Bldg. 31, Conference Room 193. On Jan. 14, Kyle Fairchild of the Advanced Programs Office will discuss a permanent human presence in space. On Jan. 21, Herbert Zook of the Solar System Exploration Division will report on the recent conference in Heidelberg, West Germany, to discuss the Comet Halley flyby of the European Space Agency probe Giotto. On Jan. 28, Dr. Bruce Bills will address whether or not 10-meter snowballs hit the Earth every 20 seconds, based on lunar seismic evidence. On Feb. 4, Dr. Jim Zimelman and Dr. Buck Sharpton of the Lunar and Planetary Institute and Dr. Chuck Wood of the Solar System Exploration Division will report on the fall meeting of the American Geophysical Union. On Feb. 11, a 1955 film made by Dr. Wernher von Braun will show how space flight was viewed 30 years ago. For more information on the seminars, call Al Jackson at 280-2296.

### Blood drives scheduled for the new year

Seventeen opportunities to donate blood have been scheduled for members of the JSC community during 1987. The blood drives are being organized by groups representing JSC, McDonnell Douglas, Ford Aerospace, Rockwell and Lockheed. Ten of the blood drives will be held at the Gilruth Recreation Center. The dates are Jan. 29, Feb. 19, March 24, May 14, May 21, July 21, Aug. 11, Sept. 3, Nov. 23 and Dec. 3. Three blood drives will be held at the Ford Bldg. at 1150 Gemini during 1987. The dates are March 10, July 30 and Nov. 10. Four blood drives will be held at the Rockwell Shuttle Operations Bldg. RS06 at 600 Gemini. The dates are Feb. 17, June 4, Sept. 8 and Dec. 10.

### Subjects sought for bone mineral study

The Space Biomedical Research Institute is seeking volunteers for a bone mineral study. The study is intended to correlate urinary calcium and urinary gamma carboxyglutamic acid (Gla) to bone density. Calcium is the major bone mineral and Gla is a protein involved in bone formation. Volunteers will fill out a questionnaire, including a medical history, submit two urine samples and have their heel density measured. The heel density test requires about 15 minutes and the radiation dose is similar to that experienced on a transcontinental flight, according to Dr. Victor Schneider. Subjects will receive an evaluation of their bone mineral status and all collected data will be available to their physician if they desire. The study is intended to add to the understanding of osteoporosis and may be beneficial for understanding factors which maintain the skeleton. For more information, call Jean Krebs at x37284.

### Stofan to address AFCEA luncheon Jan. 22

Associate Administrator for Space Station Andrew J. Stofan will address the Armed Forces Communications and Electronics Association during a luncheon Jan. 22 at the Gilruth Recreation Center. The activity begins with a social at 11:30 a.m., followed by the meal at noon and Stofan's address at 12:30 p.m. Tickets are \$7.50 per person and should be obtained from Sharon Longfellow, 280-6018, prior to noon Jan. 19.

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

## Graduate program invites proposals

JSC will support eight new proposals in 1987 during the seventh year of its highly successful Graduate Student researchers Program (GSRP).

The program, administered by the University Programs Office, has supported 55 students since 1980. Of that number, 18 students were in masters programs and 37 were in the process of obtaining their Ph.D.'s, said Dr. Stan Goldstein, Director of University Programs.

Currently, JSC has 23 GSRP student participants. "Much of the research work accomplished by

the students has been excellent," Goldstein said, "and some of it has advanced the state of the art in a variety of space related fields."

The program pays a stipend of \$12,000 to students, with an additional \$3,000 available for travel to and from JSC and for such activities as attending technical symposia. JSC also pays \$3,000 to the students' schools. Each training grant can be renewed for one additional year for masters candidates and two additional years for those working on doctorates.

To apply, graduate students and

their faculty advisors must propose a research project of interest to JSC by February 1987. The proposal can be in the fields of science, engineering or computer applications. Proposals are sent to the appropriate technical areas for review, and are then selected by a panel.

The research itself is done primarily at the university, although contact between the student, his or her faculty advisor and the JSC advisor is strongly encouraged.

To obtain more information on the program, call Goldstein at x34724.

## COBE to be launched on Delta rocket

NASA plans to launch the Cosmic Background Explorer (COBE) satellite on a Delta expendable launch vehicle rather than the Space Shuttle. This decision will further NASA's effort to pare the backlog of science payloads that cannot be accommodated on a timely basis by the Shuttle.

The COBE, designed, integrated and tested at NASA's Goddard Space Flight Center, will be launched into a 560-statute-mile, sun-synchronous orbit from Vandenberg Air Force Base in early 1989.

Carrying three scientific instru-

ments, COBE is designed to study the "Big Bang," the primeval explosion that started the expansion of the universe 15 billion years ago.

Originally scheduled for deployment from the Space Shuttle in July 1988, COBE is one of several science payloads awaiting launch as a result of the *Challenger* accident and the decision to defer activation of the West Coast Shuttle launch site until the early 1990s.

The switch from Shuttle to Delta will mean a reduction in the weight of COBE from 10,500 pounds to

5,000 pounds and a reduction in size from 15 feet to 8 feet in diameter.

Scaling down of the spacecraft will require a redesign of the spacecraft's primary structure, a reconfiguration of its solar arrays, thermal shield and the differential microwave radiometer receiver.

The Delta launch vehicle carries the usual complement of nine strap-on solid rocket boosters. However, the boosters on this version of the Delta have a higher thrust rating, allowing it to accommodate the weight of the COBE.

## Telephone system clears hurdles

(Continued from page 1)

Branch and unsuspecting employees received 500 calls for information before the number was changed back — but no major problems.

"I think if we've had a problem it's been an education problem of learning how to use this new device that has been cast upon everyone. But as the people begin to learn and as their directorate coordinators and division coordinators have assisted them in learning how to work the systems we basically have seen a very good response," he said.

Don White, Manager of Communication Services, said the division coordinators who have helped connect the Rolm system to the needs of their coworkers are the unsung heroes of the change-over.

"All in all, I can't think of a pressure point we're feeling," said White.

White said 3,000 people went to classes on use of the new telephones, videotaped lessons were broadcast daily on the JSC Television Distribution System, and in-depth training sessions were conducted for the 160 division coordinators and 140 others. White said surveys show the training program was well received and effective.

The holiday season has given many people a chance to practice with the new telephones, but others returning from leave are now having their first experiences with the new system.

The help lines — 483-HELP for voice communications and 280-4800 for data communications —

received very few calls immediately after the voice changeover, White said, but that is expected to pick up substantially as employees return to work.

For anyone having difficulty getting the hang of the new telephones, White recommends choosing a partner and practicing use of the Rolm features. Using the Quick Reference Guide provided with each phone, two coworkers should be able to become familiar with their new telephones in about 30 minutes.

The next milestone in the change-over will be removal of the old AT&T telephones, cable, and Bldg. 1 switch, Waters said. The effort will begin February 1, and is expected to be finished in 60 to 90 days. Waters said most of the work will be done during daytime work hours. So as not to disrupt other work, some jobs will be performed overnight.

On January 5, workers began to attack the backlog of moves, adds and changes that had built up since a September 1 freeze instituted so that the basic system design could be completed. Compounded by reorganizations and relocations at JSC, the backlog and redesign will take at least until April 30, Waters said.

Directories will be updated as the work on the backlog progresses. The first interim directory already is in use, and the second was scheduled to go into distribution the week of January 12. The on-line directory in PROFS also will be updated.

Waters said a permanent telephone book including organiza-

tional headings should be out in March or April. In the meantime, he said, directory users can take comfort in the fact that 500 of the old numbers at the division level and above have been retained. If you don't know someone's new number and can't find it but do know their division's old number, try calling the division's old number and asking for that person, he advised.

White suggested that people whose numbers have changed should call their old number, introduce themselves and give their new number to the person on the other end of the line. That way, the person who now has the number can transfer callers who haven't gotten the word about the change-over.

Bernard F. Stuckey, head of the Data Communications Engineering Section, said the "dial-up" asynchronous data cutover went smoother than expected and was very successful. Cleanup work still remains, he said, particularly in areas where computers needing data communication capability are not Data Processing Systems Division equipment.

Stuckey said he is especially pleased with the convenience of the new dial-up computer communication ports that route data calls through a central bank of modems.

The next major data effort will be to convert "nailed" synchronous data communications connections currently using the old Southwestern Bell and AT&T lines. The job will be accomplished prior to removal of the old system, Waters said.

## Funding for additions to Bldg. 30 and Bldg. 5

(Continued from page 1)

Terrestrial Physics Program," Fletcher said. "The program will be the most comprehensive study of the Earth's magnetosphere ever attempted and will increase our understanding of how incoming energy from the Sun is distributed, stored and released.

Other line items in the budget request include:

- \$691 million for aeronautics

and space technology, including continued work on the aerospace plane;

- \$70 million to strengthen the nation's technology base and restore NASA's technical strength;
- \$54 million for commercial programs;
- \$25 million for changes and upgrades to the Shuttle fleet;
- \$20.6 million for construction of a Space Station Processing

Facility and a Launch Complex 39 Operations Support Bldg. at KSC.

"In closing, I want to stress that NASA is grateful for the high level of support it has received over the years from the Administration, the Congress and the American people," Fletcher said. "That support has never been greater than it is today. And today, more than ever, NASA is determined to be worthy of it."

## ELV launches planned for 1987

(Continued from page 1)

Indonesia. Palapa is another in a series of communications satellites for Indonesia.

The FLTSATCOM F-8 spacecraft, to be launched May 21, brings to a conclusion the operation of the

Atlas Centaur program under NASA.

During the fourth quarter, a Strategic Defense Initiative launch is planned. This will be the second of four planned Delta launches in this series.

Also in 1987, a Scout launch from Vandenberg Air Force Base is planned for September with SOOS-2 (Stacked Oscar on Scout), a pair of navigation satellites for the Navy. NASA launched SOOS-1 in August 1985.

# Fletcher approves Station organization

NASA Administrator Dr. James C. Fletcher has formally approved the organization for the Office of Space Station at NASA Headquarters.

In addition to the associate administrator and two deputies, the approved Space Station organization includes a chief scientist, a senior engineer and six division directors responsible for Resources and Administration, Policy, Utilization for Resources and Administration,

Franklin D. Martin is the Deputy Associate Administrator for Space Station. He was previously Director of Space and Earth Sciences at the Goddard Space Flight Center before being named to his present post in September 1986.

Thomas L. Moser, former JSC Director of Engineering, is the Deputy Associate Administrator for Development, a new position established by the reorganization. In this position, Moser also will

position was the central element of program restructuring in response to recommendations of the committee headed by former Apollo Program Director Gen. Samuel Phillips which conducted an extensive examination of the Space Station organization. Moser was named to this position in October 1986.

A major portion of the systems integration will be performed at the NASA centers through Space

ing, analysis and integration activities by a program support contractor who will be competitively selected this year. The organizational structure for the program office in Washington has not been developed, and the field office managers at the centers have not been named.

Daniel H. Herman has been named Senior Engineer, a new staff position created under the Space Station reorganization. The senior engineer will advise the associate administrator on the policy, schedule, cost and user implications of technical decisions. Previously, Herman was Director of the Engineering Division, whose functions and responsibilities have been absorbed by Moser's organization and was on the original Space Station Task Force which defined the basic architecture of the current Space Station system.

David C. Black will continue to serve as Chief Scientist for the Space Station until his appointment expires. Black, Chief Scientist of the Space Research Directorate at the Ames Research Center, has served as Chief Scientist for Station since the post was created in 1984.

Paul G. Anderson will act as Director of the Resources and Administration Division, which is the combination of the former Business Management and Program Support organizations. Anderson previously served as Comptroller at the Lewis Research Center.

Margaret Finarelli is Director of the Policy Division which has functional responsibility of the former Policy and Plans organization. This element of the reorganization reflects the strong policy coordination role required of the Space Station Office in working with other elements of NASA, the international partners and other external organizations. Prior to this assignment, Finarelli was Chief, International Planning and Programs Office in the International Affairs Division at Headquarters.

Richard E. Halpern is the Director of the Utilization Division which

has responsibility for developing user requirements for the Space Station, including science and applications, technology development and commercial users, and ensuring that those requirements can be efficiently and economically accommodated on the Space Station. Halpern was the director of the Microgravity Science and Applications Division in the Office of Space Science and Applications prior to accepting this position.

The Operations Division has the responsibility for developing an overall philosophy and management approach for Space Station system operations, including user support, prelaunch and postlanding activities, logistics support and financial management. Granville Paulus is currently serving as acting director of the Operations Division.

Under the new organization, two new divisions, Strategic Plans and Programs and Information Systems, were formed. Alphonso V. Diaz has assumed the position of director of Strategic Plans and Programs and has responsibility for ensuring that the evolution of the Space Station infrastructure is well planned and coordinated with other NASA offices and external elements.

As part of its responsibility, this division will manage and act as the single focus for Space Station automation, robotics activities, program-focused technology and advanced development work. Diaz has been at NASA Headquarters since 1979 and most recently served as Deputy Director of the Solar System Exploration Division within the Office of Space Science and Applications.

The Information Systems Division will provide a management focus for the total end-to-end information system complex for Space Station. A director for that division has not been named.

William P. Raney, who had served as director of the Utilization and Performance Requirements Division, is currently serving as Special Assistant to the Associate Administrator.



Policy, Utilization, Operations, Strategic Plans and Programs and Information Systems.

The organization plan also includes the position of special assistant to the associate administrator.

The Associate Administrator for the Office of Space Station is Andrew J. Stofan, former Director of the Lewis Research Center. He was named to that position in June 1986.

serve as the Program Director for Space Station, directing the Washington-area office that will be responsible for overall technical direction and content of the program, including systems engineering and analysis, program planning and control, configuration management and the integration of all the elements into an operating system.

Creation of the program director

Station field offices to be established at JSC, Goddard Space Flight Center, Kennedy Space Center, Lewis Research Center and Marshall Space Flight Center.

The Space Station project manager at each of the five centers will head the field office and will report directly to Moser in Washington. The program office and field offices will be assisted in systems engineer-

## Studies clear way for Phase C/D RFPs

With the completion of additional studies on the Space Station in three critical areas, NASA is now ready to release formal Phase C/D requests for proposals (RFPs) to the aerospace industry in February.

The studies, requested by Administrator James C. Fletcher in September, indicate that the Shuttle should remain the primary transportation system for Station construction, and that the cost of design changes to the facility will be about \$49 million. The studies also supported the management approach in which overall technical direction for the program would originate in Washington.

Fletcher accepted the studies Dec. 23 and directed that changes in station design which resulted from a review conducted last summer be implemented, clearing the way for final Phase C/D RFPs.

In September, Fletcher had directed the Space Station office to provide additional detail in the three areas as a prerequisite to approving recommendations made by the Critical Evaluation Task Force (CETF) last summer.

Design changes recommended by the CETF included replacing the nodes and tunnels in the original Space Station design with larger "resource" nodes. The nodes are used to connect the pressurized modules.

The expanded nodes will house racks of command and control equipment. In the baseline configuration, that equipment had been located outside on the framework of the Station. The change was made to reduce the amount of extravehicular activity required to maintain and replace equipment over the lifetime of the facility

The CETF also recommended revising the assembly sequence to provide early scientific return and reduce extravehicular activity on early Station assembly flights. The design also incorporates an initial power level of 37.5 kilowatts of power, achieves a permanent manned capability with fewer Shuttle flights, places the fixed servicing capabilities closer to the modules, and makes room for early payloads. The design also reduces EVA requirements for assembly and maintenance of the Space Station, and features an improved safe haven capability.

The oversight committee recommended a realignment of certain work package responsibilities. Under that realignment, the Marshall Space Flight Center responsibilities included the laboratory, habitation and logistics modules, engine elements of the Space Station's propulsion system and the resource node structure. The Johnson Space Center responsibilities included the external truss, distributed subsystems, EVA systems, manned space systems, components and hardware in the habitat module, airlock and resource node outfitting.

The Goddard Space Flight Center's responsibilities included the Space Station platforms, attached payload accommodations, robotic servicer and NASA's role in servicing. The Lewis Research Center's responsibilities included the power system. Contractual arrangements for the development phase between the Johnson Space Center and the Marshall Space Flight Center were to be reflected in specific exhibits in the contracts for each center's

work package and were further documented in memoranda of understanding signed by both center directors.

The additional analysis requested by Fletcher focused on the functional and organizational dimension of the Space Station headquarters structure within the overall management of the program, the potential for using expendable launch vehicles, particularly with regard to Space Station launch and assembly, and the cost impacts of the task force recommended design modifications to the baseline configuration.

The potential use of expendable launch vehicles, existing or planned in the near term, was examined by a team headed by John Dunning of the Station Project Office at Lewis. The team's analysis indicated that, under certain conditions, the schedule for achieving major milestones in the assembly sequence could be accelerated by four to nine months using ELVs.

Use of expendables, however, would increase the amount of EVA work required during the first four assembly flights by from 10 to 40 percent, and would require basing an Orbital Maneuvering Vehicle at the Station throughout assembly to control, boost and reboost passive structural elements. Use of ELVs also could impact the weight and design of Station components because of the higher dynamic forces associated with unmanned rockets.

The analysis also showed that accelerated assembly using ELVs was dependent upon retaining the current Shuttle flight rate and also required the use of as many as three Titan IVs during the first two

years of assembly activity.

The study led to the conclusion that operational risks outweigh possible gains, and the Station Office recommended that the Shuttle be retained as the baseline transportation system for assembling the Station.

Analysis of the Station management structure, with emphasis on system engineering and integration, was conducted by a study



Astronauts pilot a robot arm from a Station cupola, an approved new design feature of the facility.

Ross' group examined the relationship between the program office in Washington, and the project offices at the NASA field centers. The resulting recommendation was consistent with NASA's earlier decision to establish a program office in the Washington, D.C., area.

The study team concluded that this approach provided the most effective means to achieve the required level of program control and program accountability, coupled with an ability to utilize effectively the expertise that resides at the field centers.

team headed by Larry Ross, Director of Space Flight Systems at the Lewis Research Center.

The final item that was examined was the cost impact of the configuration changes recommended by the CETF. The analysis showed a net increase of approximately \$49 million due primarily to replacing the nodes and tunnels, as defined in the original baseline configuration, with larger "resource" nodes

and to increasing the power level of the photovoltaic solar arrays from 25 to 37.5 kilowatts. In addition, two cupolas were added to the configuration as was some support structure for the reaction control system.

A separate major review of Space Station cost estimates is currently underway. This review, which began in September, is being conducted by a team of approximately 35 technical and resource experts from the Space Station office and the NASA Comptroller's office. Results of this review will be presented to Fletcher in mid-January.

# 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

Sale: League City 3-2-2 all-brick house in The Landing, ex. cond., FPL, W/D inside, custom miniblinds, assume 9.5% FHA loan, low equity, 554-7735.

Lease: Condos in Dillon, Colo., Hawaii, Manzanillo, Conzumel, Fla., New Orleans, your choice of location and time, \$460/wk. Chuck McCain, 280-1667.

Lease: Heritage Park 3-2-2, formal dining, fence, new paint, refrig., FPL, large kitchen, \$525/mo. 482-6609.

Lease: Friendswood/Forest Bend, formal dining, fence, FPL, new paint inside and out, large kitchen, \$475/mo. 482-6609.

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

Lease: University Trace townhouse, 2-2.5-2CP, all appliances, FPL, security system, two pools, sauna, gym, \$475/mo. 333-4044.

Sale: Camino South, 3-2-2A, formal LR, cov'd patio w/fan, low equity, \$69,900. Andy or Kevin, 280-1746 or 280-9861.

Sale: '82 14 x 70 mobile home, 2 BR, central A/C, large kitchen w/appliances, separate dining, above-ground pool, BO. Jeff, 585-3922 or x30788.

Sale/lease: Pasadena/South Houston, 3-1.5-2 brick, central air/heat, all appliances, carpet, drapes, no pets, \$455/mo. or \$46,500 w/8.5% VA loan at \$340/mo., owner equity \$16,500. 941-5908.

Sale/lease: Pasadena 3-1-1, den, breakfast area, appliances, freshly painted, new carpet, drapes, fence, no pets, \$400/mo. or \$35,500 w/8.5% assumable VA loan at \$227/mo., owner equity \$15,000. 941-5908.

Rent: Friendswood/Forest Bend townhouse, 3-2.5-2CP, 1,600 sq. ft., \$500/mo. plus deposit. Mike, x38150 or 474-4482.

Sale/lease: Heritage Park 4-2-2, new carpet, stove, dishwasher, paint, shady yard, \$510/mo. or \$57,500. Karl, x35067 or 333-3544.

Lease: CLC Baywind II condo, 1 BR, drapes, FPL, all kitchen appliances, utility closet W/D connections, swimming, tennis, \$270/mo. 488-5019.

Rent: West Galveston Island beach house, 3-2, furnished, central air/heat, day/week/month. Ed Shumilak, x37686 or 482-7723.

Sale/lease: Nassau Bay 2,200-sq. ft. townhouse, new carpet, paint, large garage, deck, atrium, 20-ft. FPL, \$890/mo. or \$119,900. Jerry, 474-4310.

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

Rent: Forest Bend townhouse, 2-1.5, water, trash, pool access included, \$400. March, 338-2074.

Rent: Glen Cove 4-2-2 house, den, FPL, security lights and fence, all appliances, drapes, fans, private park w/boat ramp and fishing pier, \$650/mo., \$600 deposit. 438-1816 or 332-3989.

Lease: League City 3-2-2 on South Illinois, garage door opener, refrigerator w/ice maker, drapes, FPL, fenced, landscaped, \$575/mo. Michele, x33711 or 332-5236.

## Cars & Trucks

'78 Jeep J-19 Honcho truck w/Coachmen camper, \$3,200. 474-2906.

'86 Silverado three-quarter ton pickup, custom interior, 11K miles, charcoal gray, \$13,500. Cindy, x34165.

'82 Honda Civic, \$3,995. Mike Lake, 523-2137.

'84 Continental Mark VII LSC, diesel, executive car, loaded, low miles, ex. cond. 559-1286.

'81 Subaru GL station wagon, 4-wheel drive, standard trans., good cond., \$2,000 OBO. 280-2053.

'77 Ford LTD Brougham, V8, AC, auto., PS, runs good, \$1,900. x35972.

'82 Cutlass Supreme Brougham, auto. trans., PS, PB, PW, PL, PS, A/C, V8, 4-door, ex. cond., \$4,500 OBO. Alan, 334-5478.

'84 Chrysler New Yorker, 31K miles, 2.2 litre turbo, loaded, \$9,000. Beverly, x3362 or 649-0521.

'85 BMW, black 318i model, 2-door, 5-speed, sunroof, all accessories/options, ex. cond., \$14,500 OBO. Rene, x34261 or 667-7303.

'78 Honda CX500, \$500 OBO. Rusty, x31956 or 486-5581.

'77 Olds Omega Brougham, V8, good cond., \$800. Thibodeau, 480-0919.

'75 Ford Ranchero, PS, PB, A/C, 351m engine, auto. Calvin, 470-9938.

'85 Cadillac El Dorado, 6K mi., ex. cond., royal blue, leather interior, kept in garage, loaded, \$17,500 OBO. John or Greta, 488-1956.

'71 Triumph TR-6, parts car, engine

\$300, hard top \$300, wire wheels, w/red lines, \$300, body, \$500, running gear, \$500. Max, x32814 or 488-4135.

'77 Buick Estate wagon, clean, full power, new paint, \$875. Jack Kinsey, x32271 or 486-0421.

'83 Ford Escort GL, 5-speed, A/C, ex. cond., 41K mi., \$3,250 OBO. Dolores, x32864 or 335-1695.

'80 Chevrolet Van Glo, SWB, A/C, carpet, tape deck, 61K mi., ex. cond., \$2,250 OBO. 333-2166 or 282-4262.

## Audiovisual and Computers

Computer equipment, 8-inch disk drive, 5.25-inch disc drive and cabinets, S-100 computer boards, mother board and cabinet, operating system, BO parts or all. Chuck McCain, 280-1667.

Stereo, Technics receiver, Pioneer cassette deck w/Dolby, Omega speakers, \$300. Jon, 482-7873.

Escort radar detector, was \$250, now \$150; AM-FM Emerson tabletop radio console, built-in 8-track, turntable; theft-proof motorcycle lock, was \$125, now \$65. 482-3033.

Technics 3-way linear Phase speakers, great sound, good shape, \$75/pr. Jeff, 282-3492 or 996-0928.

Dynaco stereo 120 amplifier and Pat-4 preamp, \$100 OBO for both; Pioneer TX-6200 AM-FM stereo tuner, \$50 OBO; all units ex. cond., manuals, connector cables incl. Sandy, 326-2906.

Pentax K-1000, hard case, doubler, 55mm lens, 80mm telephoto, flash, like new, \$195. Don, 482-7102.

RBase 5000 software, never used, \$95, upgradeable to RBase 5000 System 5 which retails \$700, package for \$400. 333-2636.

TI-99/4A computer, speech synthesizer, extended Basic, stand-alone Axiom printer interface, dual cassette cable, 2 word processing programs, several games, \$400 value, now \$150. 488-5471.

Automatic lenses for Canon FD cameras, 28mm wide-angle, 80-205mm zoom, \$50/ea. or \$85/pr. 488-5471.

Nikonos V underwater 35mm camera w/28mm f3.5 lens, auto. exposure, 160-ft., 1-year Nikon warranty, \$480. Bill, x32595.

Hitachi color video camera (VHS), 7fc, out of warranty but like new, \$200 OBO. Al, x31064 or 482-4190.

Eumie Super 8 sound movie system (camera and projector), ex. cond., \$150 OBO. Al, x31064 or 482-5190.

Heathkit H-8 computer, H-19 terminal, two floppy drives, 64K, complete w/manuals, users group magazines, \$200 OBO. 554-5933.

## Boats & Planes

Sailboard, '84 Mistral Tarifa, 6.0 RAF full batten sail, all accessories, \$850. 554-2992.

'76 Seasprite open bow, tri-hull, 75 hp. Evinrude, new interior, looks, runs great, \$2,700. Rusty, x31956 or 486-5581.

John boat, 14-ft., semi-V hull, 20 hp. Mercury outboard, galvanized metal trailer, \$1,200. 554-2992.

Bilge pump, 1m750-gal./hr., slightly used, 12 volt, 8.5 amp., was \$67.95, now \$30. Plauche, 474-2660.

'83 16-ft. Hobie Cat, special edition, multi-colored sails, galvanized trailer w/custom boat box, many extras, stored indoors, \$2,990. Carls, 538-1148.

## Cycles

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

'78 Suzuki 400GS, backrest, luggage rack, new battery, new tires, fairs, brush guard, good shape, low miles, \$350. Calfin, 470-9938.

Mongoose BMX bicycle, diamond-back racer, BO. 333-2516.

## Household

Loose pillow-back sofa, navy blue on ecru, \$100. Thibodeau, 480-0919.

Contemporary white sofa and 4 matching chairs, BO. 333-2516.

Simac II Gelataio, The Ice Cream Man frozen dessert maker, like new, \$125. 333-2395.

Bedroom suite, cherrywood, Queen Anne-style, king headboard, night table, chest, vanity, \$975. 488-3588.

Limited edition solid pine waterbed w/heater, hutch-style headboard, tulip lights, etched mirrors, sheets, padded rails, mattress pad included, was \$700 now \$400 OBO. Gina, 538-1423.

Antique buffet and matching cabinet, perfect cond., dated 1870, \$500 for both. 488-5564.

Two bedroom suites, couch and chair set, dishwasher, x39856.

Two sofas, 82-inch, olive velvet, 3 gold upholstered chairs, walnut coffee table,

2 walnut end tables, ex. cond., reasonable. Laverne, x33844 or 326-1404.

Jenny Lynn baby crib, Simmons mattress, both good cond., \$50. 488-2219.

Bumper pool table, converts to card table and dining table, \$90. Valerie, x34210.

Dinette set, 2 chairs, wood, \$50. Alan, 334-5478.

## Musical Instruments

Fender Precision bass guitar, mint cond., hardshell case, \$400. Tim, x37066 or 280-9774.

Trumpet, Olds silver chrome finish, good cond., \$175 OBO. Rick, 282-2714 or 559-2735.

Coronet, H Couf Royalist, silver finish, good cond., w/case and MP, \$200 OBO. Rick, 282-2714 or 559-2735.

Seiko digital keyboard, DS-101, stand, carry case, \$400. 480-1213.

Fender Stratocaster, hard case, Peavey amp., \$450. Cindy, x34165.

## Wanted

Want Minolta camera body with or without lens, prefer older model (101, 102). 332-2229.

Want type C motor home for one week, March 14-21. Dick Sauer, x37121.

Want test subjects for speech recognition experiments. Mark, x34927.

Want lawn work or light hauling for retired man. Joe Marks, 734-4058.

Want loveseat and coffee table, good cond., will pay \$150. Faye, x30966.

## Pets

One-year-old white male Persian cat w/papers, \$150. Kim, 332-0875.

Free 2.5-year-old Brittany spaniel w/shots, spayed, good upland hunter, has heartworms that can be treated for about \$200. Garland, x33134 or 333-3114.

## Lost & Found

Lost: Belt to mulberry-colored London Fog raincoat. Karla, x30537.

## Miscellaneous

Ed Beckley Real Estate Course book, tapes, works great, \$150. Jeff, 282-3942 or 996-0928.

Tires and wheels, 4 Goodyear Vector snow and mud tires, P205/75R15, balanced on wheels plus spare tire and wheel, tires only were \$89, asking \$250 for all. 326-2223.

Old United States stamps, some mint, some used, also first-day covers. Tim, x37066 or 280-9774.

Ajay VS-2000 variable speed motorized treadmill, like new, was \$399, asking \$200. Bruce, 482-1665.

Firewood, \$125/cord, delivered and stacked, will sell half and quarter cords. Joel, 482-7967.

Honey, light amber color, derived from corn and milo, \$10/gal., smaller quantities available. Clarence Blume, x38820 or 554-02911.

Lyman 12-gauge reloader, \$34; new Baretta 12-gauge over and under, 28-in., modified and full, double trigger, \$329. Tom, 409-925-6355.

Membership in Marikna Village Camping Club on Lake Livingston, \$2,000. 479-4702.

Chrysler 50 hp. motor w/controls, \$485. Ben, x31588.

Browning Citori over and under shotgun, choked skeet and skeet, ex. cond., recoil pad and luggage case, \$625 OBO. Glenn M., x38825 or 487-8018.

Sears chemical porta-potty, like new, perfect for van or camper, was \$100, now \$50; catalytic converter, \$25. 332-2229.

Solid ivory chess set, highest pieces 6 inches, carved by master artist of India. 326-2282.

Rossignol STS skis, 190cm, never been used, marker m46 bindings in box, BO. 538-4327.

Dynastar Omeglass II snow skis, 203cm, Marker bindings, Rache leather-lined freestyle ski boots, men's size 9, great shape, \$265 new. 538-4327.

Octa-Gym, like new, wooden table, desk light, snorkeling equip. (new cond.), bulletin board, iron. Linda, x32745 or 480-3187.

Ladies tan trenchcoat, Etienne Aigner, size 8, \$75. Bob, x31599 or 472-2163.

Portable racquet stringer, Little Major, \$250 OBO. Robert, x31599.

Car telephone for long-distance reception, operator required, Glenair 2000 head, Aeroton 600 VHF transceiver, complete, was \$4,000 asking \$500 OBO. 474-2906.

Table saw, Boise-Crane cast iron on wheels, \$125; ladies mink coat, stroller length, \$1,200. 488-3588.

Go Kart, 5hp. 10-15 hours on engine, \$225 OBO. Richard, x33742 or 474-9334.

Tires, 2 used Generals, raised white letters, 15-in., thousands of miles of life

remain, \$15 ea. Richard, x33742 or 474-9334.

Aquarium, 25 gallon, stand, pump, all accessories, \$75. Jon, 482-7873.

## Gilruth Center News

Call x30304 for more information

**Ballroom dance** — This 8-week course offers professional instruction in beginning, intermediate and advanced ballroom dancing. Classes began Jan. 8, but spaces are still available; cost is \$60 a couple. Advanced class meets 7 to 8:15 p.m.; intermediate class meets 8:15 to 9:30 p.m.; beginner class meets 8:15 to 9:30 p.m.

**Country & Western dance** — Beginner classes in the two-step, Cotton-Eye-Joe, Schotish and waltz. The 6-week course is offered Mondays and Wednesdays 9 to 9:30 p.m. beginning Jan. 26. Cost is \$20 a couple.

**Defensive driving** — Learn to drive safely and qualify for 10-percent reductions in auto insurance for the next three years. This all-day Saturday class, taught by a representative from the Safety Council of Greater Houston, meets 8 a.m. to 5 p.m. Jan. 17 or Feb. 21. Space is limited.

**Weight safety** — This is a required course for JSC employees interested in using the Rec Center weight room. The class will be offered Jan. 15 and 28 from 8 to 9:30 p.m. Cost is \$4.

**Karate** — A continuous program of learning "Cha Yon," the Natural Way, consists of Taekondo, Kung Fu, Hapkido and Shido Ryu. This system was designed by Grand Master Kim Soo. This 4-week class starts Jan. 26 and will meet Mondays and Wednesdays from 7 to 8 p.m. Cost is \$25.

## Cookin' in the Cafeteria

### Week of January 12 — 16, 1987

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

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

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

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

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

### Week of January 19 — 23, 1987

**Monday** — Holiday - Martin Luther King, Jr.'s Birthday

**Tuesday** — Tomato Soup; Potato Baked Chicken, BBQ Spare Ribs, Mexican Dinner (Special); Squash, Broccoli, Ranch Beans, Spanish Rice.

**Wednesday** — Seafood Gumbo; Liver & Onions, Baked Turbot, BBQ Ham Steak, Baked Meatloaf w/Creole Sauce (Special); Beets, Brussels Sprouts, Green Beans, Whipped Potatoes.

**Thursday** — Beef & Barley Soup; Chicken & Dumplings, Corned Beef w/Cabbage, Smothered Steak w/Cornbread Dressing (Special); Spinach, Cabbage, Cauliflower au Gratin, Parsley Potatoes.

**Friday** — Seafood Gumbo; Pork Chop w/Yam Rosette, Creole Baked Cod, Tuna & Salmon Croquette (Special); Brussels Sprouts, Green Beans, Buttered Corn, Whipped Potatoes.

### 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.

## 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.