

Space News Roundup

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National Aeronautics and Space Administration

New space policy stresses exploration, commerce

The new space policy issued this month by President Ronald Reagan officially establishes a national goal of expanding human presence in our solar system and recognizes for the first time that there is a commercial space industry.

"With the new policy, President Reagan has added a major new thrust to the objectives and directions that have guided the civil space program for the past three decades," said NASA Administrator James C. Fletcher in announcing

the new policy with Commerce Secretary C. William Verity and Transportation Secretary Jim Burnley.

"The policy clearly establishes that, for the first time, the United States has a long-range goal of expanding human presence and activity beyond Earth orbit into the solar system," Fletcher said. "This is a policy of investment in the future. It lays the necessary groundwork now for the decisions of the next century. It puts a

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challenge squarely on NASA. And it is a challenge we accept."

To help meet that challenge, the policy announced the President's intention to request \$100 million in 1989 for the "Project Pathfinder" exploration technology development program.

The policy also lays out a 15-point commercial space initiative that includes a statement of the

government's intent to lease space as an "anchor tenant" in a privately owned orbiting space research and manufacturing facility, encourages government agencies to buy commercial space goods and services, and states that administrative steps will be taken to limit third-party liability in private launch accidents.

Verity said the policy shifts major responsibilities for space development from the public to the private sector, taking advantage of the strengths of both.

"This reform will save the government money, reduce the amount of funding it must supply up front, and shift the risk of cost overruns to the private sector," Verity said. "Space technology will build new industries and jobs and assure a competitive economy into the next century."

The policy defines the roles and responsibilities of federal agencies in three distinct areas: civil, national security and nongovernmental. It

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JSC Photo by Jack Jacob

SHAPE OF THINGS TO COME—NASA Administrator James C. Fletcher inspects the new Transition Flight Control Room in Bldg. 30 during a visit to JSC on Feb. 19. Jack Seyl, chief of Mission Support's Systems Development Division, briefs him on the capabilities of the new work stations being developed.

JSC processes largest one-time purchase

A \$240 million purchase request for work on the replacement Orbiter—the largest ever fully funded through JSC—was processed this month by the Space Shuttle Procurement Office.

It is likely that the fully funded PR is also the largest that has ever been processed by the entire agency in a single action," said R.E. Easley, chief of that office.

The purchase request provided incremental funding to the new Orbiter contract with Rockwell International, bringing the total funding authorized on the contract to \$460 million. Total value of the contract is \$1.3 billion.

Easley said JSC has awarded multibillion-dollar contracts many times in the past, but neither JSC nor the agency was able to fully fund the contract all at once. Funding the contract allows the contractor to bill the government and be paid for the cost incurred.

After the STS-51L accident, Congress appropriated at President Reagan's request \$2.1 billion to replace the *Challenger* Orbiter, main engines and other hardware. For the first time, the total estimated cost of a major NASA project was funded at the outset, Easley said. Such funding is referred to as "all up-front money," and technically

called "no-year funds," he explained.

With total funding available, JSC was able to request a proposal for the new Orbiter (OV-105) on an optimum build, cost effectiveness basis, Easley said. In previous Orbiter contracts, manufacturing schedules had to be geared to available funding determined by Congress each year.

Delivery date for OV-105 is April 1991. Total cost is estimated at \$1.7 billion, which includes about \$400 million in major structural components that were placed under contract in 1983 and are now mostly complete. The maiden voyage of the new Orbiter is targeted for 1992.

President asks \$11.5 billion for NASA in '89

President Reagan has requested \$11.5 billion in NASA funding for fiscal year 1989, a "substantial increase" over the amount appropriated in 1988, NASA Administrator James C. Fletcher announced Feb. 18.

JSC would receive \$1.9 billion, an increase of about \$438 million over fiscal '88, according to the Agency Budget Request to Congress.

"The President's fiscal '89 budget gives NASA what is needed to carry forward our ongoing programs in space and aeronautics, and to take the essential next steps to assure future U.S. leadership in space as set forth in the President's national space policy," Fletcher said.

The request represents a 27 percent increase over the \$9.026 billion appropriated for NASA in fiscal '88. It includes \$4.45 billion for research and development, \$4.84 billion for space flight, control and data communication, \$285 million for construction of facilities and \$1.91 billion for research and program management.

For JSC, the request includes \$588.2 million for research and development, \$980.3 million for space flight, control, and data communication, \$33.5 million for construction of facilities, and \$301.5 million for research and program

management. The R&D portion of JSC's budget includes \$354 million for Space Station work.

"We have to meet the cost to build our flight rate back up to seven per year in 1989 and 10 per year in fiscal 1990. The Space Station will be moving into full-scale hardware development," Fletcher explained. "The fiscal '89 budget provides the normal buildup and funding required in the second year of this major development program."

"The fiscal '89 budget recognizes that these built-in increases are essential to keep our national commitment to return the space shuttle to flight and to carry out the President's recommendation, now approved by the Congress, that the United States should proceed with the development of a permanently manned space station," he said.

The NASA budget also reflects the Administration's high priority in the overall '89 budget for science and technology, Fletcher said. NASA's budget includes a robust space science program, including preparations for major astronomy and planetary missions for launch when the Shuttle is ready, expendable launch vehicles for future science missions and initiation of a major new observatory, the Ad-

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Solid Sam stands out as friend

Part-timer keeps astronaut gym running smoothly

By Beverly Green

For more than a decade, Sam Sammiago has quietly eliminated distractions and made the astronaut gym a safe haven from everything but physical exertion.

Although the 74-year-old property custodian now works half days, his services still ensure the astronauts' freedom to concentrate and the full-time reliability of equipment.

"The gym provides a good place to unwind when things get frustrating," said astronaut Bill Thornton. "Sam automatically assumes he's responsible for everything that we need. One can take for granted that Sam will always greet you with a smile and maintain an atmosphere that helps to make things just a little easier," he said.

Sammiago began working at JSC in 1967 as a janitor for several buildings. During the early '70s he became the full-time property custodian for the astronaut gym, and in 1981 he cut his workday in half.

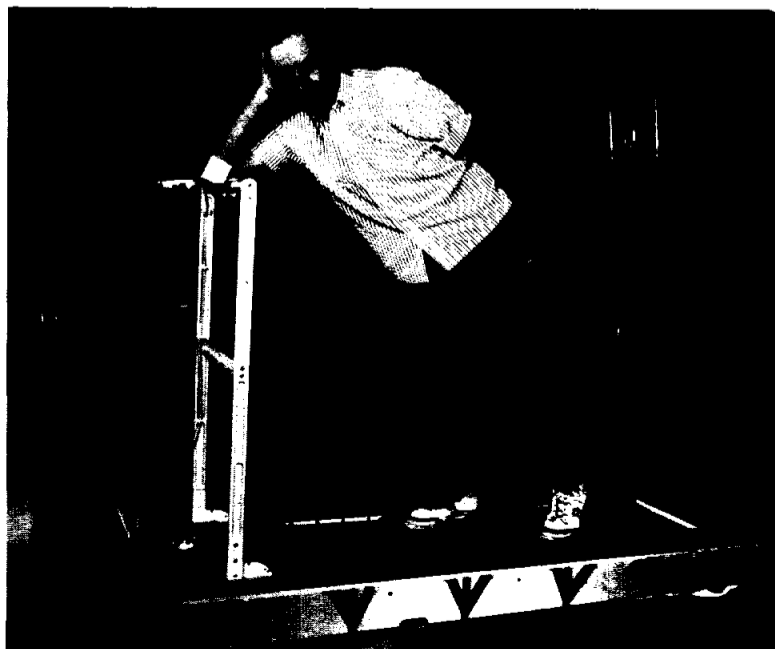
"He's definitely a jack of all trades and he's always right on top of equipment malfunctions, therefore I

can handle most of the problems over the phone," said Mary Lee Meider, head of special activities in the Astronaut Office.

From the weighty responsibility of ensuring properly working equipment to the tedious task of laundering gym clothes, the dark-haired guardian keeps track of everything from treadmills and socks to spotless floors and cleansers. "He knows if anything is missing or how long your stuff has been in a certain place because he uses a number scheme that corresponds lockers and the property of each astronaut. It's his personal coding system and I don't think that anyone else can figure it out," said astronaut Mark Lee, gym monitor.

The humble, soft-spoken fisherman enjoys sharing his relaxing hobby with his astronaut friends.

"I can remember his bright yellow truck coming to pick me and my son up for fishing engagements," reminisced retired astronaut Joe Allen. "Sammiago would have everything ready, from baits and poles to cokes and snacks. All we would have to have ready was ourselves."



JSC Photo

Sam Sammiago poses with one of the many pieces of astronaut gym equipment that he maintains.

People

Zehentner top shoe slinger

Frank Zehentner, a motion picture laboratory supervisor for the Photography and Television Technology Division, won the men's division of the Area Go Texan Horseshoe Pitching championship during the Houston Livestock Rodeo. Teammate Art McCreey, a retired businessman from Dickinson, and Zehentner represented Galveston County and defeated Fort Bend county pitchers for a marginal win, 21-20. Zehentner belongs to local state and national horseshoe pitching organizations.



Zehentner



Oberg

Soviet disaster book out

Jim Oberg, an engineer in the Orbit Dynamics Section of the Flight Design and Dynamics Division, has published a new book, "Uncovering Soviet Disasters: Exploring the Limits of Glasnost." He will host an author's party from 11 a.m. to 1 p.m. and 6 to 8 p.m. Thursday, March 10, at the Allen-Maxwell Bookstore in Nassau Bay Shopping Center. The book, to be released Feb. 29, is being published by Random House.

Cohen elected NAE member

JSC Director Aaron Cohen has been elected a member of the National Academy of Engineering. Election to the Academy reflects "distinguished contributions to the broad fields of engineering, engineering science and technology and to the world in which we live," according to a letter that informed Cohen of his selection. An induction ceremony for new members is scheduled Sept. 28 during the Academy's 1988 annual meeting in Washington, D.C.



Cohen

Bulletin Board

JSC blood drive scheduled March 1

The first JSC blood drive for 1988 is scheduled from 8 a.m. to noon and 1 to 4 p.m. March 1 at the Gilruth Recreation Center. For more information call Helon R. Crawford, x34714.

IEEE sponsors vendor seminar March 2

The IEEE Education Committee is sponsoring a free vendor seminar on March 2. The topic will be "Fundamentals of Artificial Intelligence." For more information, call Eddie Robinson, 333-7029.

Area Macintosh Users meeting scheduled March 7

The next NASA Area Macintosh Users (NAMU) meeting will be at 7 p.m. March 7, at 600 Gemini (RSOC cafeteria). Hardware and software demonstrations, questions and answers, public domain software and Special Interest Groups (SIGs) will be featured.

Space Society meeting scheduled March 10

The Clear Lake Area Space Society will meet at 7:30 p.m. Thursday, March 10, at the Gilruth Recreation Center, Rm. 207. Jim Davidson will give a presentation on "Conestoga: Launching America into the 21st Century." For more information call Chuck DiFalco, x31701.

Osborne Group meeting scheduled March 12

The Clear Lake Osborne Group (CLOG) will hold its monthly meeting at 10 a.m. March 12 in the Webster Presbyterian Church. This is a computer group for CPM, and MS-DOS computer novices and owners. CLOG has a library of both CPM and DOS software available to its members. For more information call Vernon Kane, 332-6414.

Pilot Club sponsors third annual fun run

The Bay Area Pilot Club, a women's community service organization, is sponsoring its third annual fun run on Saturday, March 5 at the University of Houston-Clear Lake. There will be a one-mile youth run at 8 a.m. followed by a 5K youth run at 8:30 a.m. Proceeds will benefit charities within the Bay Area. For more information call Terry Bantle, x34422.

NARFE April meeting planned

The April meeting of the NASA chapter of the National Association of Retired Federal Employees will be at 1 p.m. Tuesday, April 5, at the Harris County Park Bldg., 5001 NASA Rd. 1. Photographic tips will be presented by photographer Norma David, who asks that everyone bring a camera. For more information call J.B. Fox, 333-4460 or Burney Goodwin, 326-2494.

Foreign language classes offered at UH-CLC

Non-credit foreign language classes in French, German, and Russian will again be offered at the University of Houston Clear Lake and will begin Feb. 29. Small group classes at all levels of proficiency will be held in the Bayou Bldg. and at the Regent's Park Training Facility. Classes will meet weekly for 1 1/2 hours for a 7 week period. Cost is \$92 for new students, and \$89 for returning students. For registration materials or more information call 488-9315.

Gilruth Center News

Call x30304 for more information

EAA badges—Dependents and spouses may apply for photo I.D. badges between 6:30 and 8:30 p.m. March 1 and 7.

Defensive driving—Course is offered March 26 from 8 a.m. to 5 p.m. and costs \$20.

Weight safety—This is a required course for those employees wishing to use the Rec Center weight room. The class will be March 9 and 24. The cost is \$4.

Physical fitness—The next 12-week course of the JSC Physical Fitness Program will be April 4 through June 24 from 11 a.m. to noon or from 4 to 5 p.m. All NASA and contractor employees and dependents are eligible upon completion of an acceptable physical exam and a maximal treadmill stress test. For more information call x30301.

Tennis—Tennis classes begin March 21 and will meet every Monday from 7 to 9 p.m. for six weeks. Cost is \$32.

Scuba—Scuba classes begin March 21 and will meet every Monday and Wednesday from 7 to 9 p.m. for six weeks. Initial cost is \$45, with \$80 due upon first class meeting.

Country & western dance—Dance classes will begin March 28 and will meet every Monday for six weeks. An intermediate class will meet from 7 to 8:30 p.m., and a beginners class will meet from 8:30 to 10 p.m.

Scholarship applications due soon

Two separate scholarship programs will be available to dependents of JSC employees this year. Scholarships are offered by the JSC Employee Activities Association and the NASA College Scholarship Fund.

Three EAA scholarships will be awarded this year and may provide \$4,000 for study at any college or university to be dispersed up to \$1,000 annually. Since the 1967 inception of the EAA program, 51 dependents of JSC employees have received scholarships.

The application period for the EAA Scholarships runs through April 1. Application forms are available in Bldg. 45, Room 712. For information call Avis Nettles, x33164, for information.

EAA scholarships are open to students who will graduate from a public, private or parochial high school in 1988 or students currently enrolled in college with a good academic standing. High school applicants must have a grade point average of at least 2.5 on a 4.0 scale or the equivalent. Applicants must be dependents of JSC employees who have worked at the center,

White Sands Test Facility, Downey, or at KSC Resident Offices for at least two years as of Jan. 1, 1988. The scholarship winners may pursue any course of study leading to a recognized degree from an accredited college or university.

Dependents of JSC employees who during the past year were medically retired or deceased and who otherwise would have met these qualifications also are eligible. For the purposes of the scholarship, dependence is defined as having been listed on an employee's federal income tax return as a dependent.

The scholarship will be awarded on the basis of scholastic achievement, extent of financial need and breadth and substance of school and community activities.

High school students are expected to provide a transcript and a record of their scores on the ACT or SAT tests. College students also are expected to provide a transcript of both high school and college grades, as well as their ACT or SAT scores.

Scholarship winners will be announced by the end of April.

The NASA College Scholarship

Fund, Inc., was set up in 1982 through a gift by author James Michener. The corporation has offered scholarships since then to qualified dependents of NASA and former NASA employees, agency-wide. This year, two \$1,500 scholarships will be awarded.

Generally, the NASA scholarship is \$1,500 per student, per year, not to exceed \$6,000 over six calendar years. Eligibility requirements are similar to those for the EAA scholarship, however, the NASA scholarship is limited to students studying in the engineering or science fields.

Applicants are ranked on the basis of academic preparation, school activities, community activities, performance on ACT and SAT tests, written recommendations from instructors or other references, and a one page statement of academic purpose written by the student.

Application forms for the NASA College Scholarship are available in Bldg. #1, Room 541. Interested persons may call Cheryl Howard, x38969, for more information. The deadline for applications is March 27.

New space policy boosts commerce

(Continued from page 1)

directs federal agencies to rely on private launch services to the fullest extent possible, and encourages the construction of commercial launch range facilities.

DOT Secretary Burnley said U.S. firms expect to compete for contracts to launch 15 to 20 satellites per year for the foreseeable future, having signed contracts to launch 13 satellites through 1991.

Fletcher said the new policy reaffirms the President's strong support for the Space Shuttle and the permanently manned Space Station. The decision to lease space on a private orbiting space facility does not water down the scope of NASA's Space Station, he said, explaining that the lease, costing an estimated \$140 million annually for five years, will be an add-on to NASA's budget.



SUIT SEEN—Dr. Leonard Fisk (center), associate administrator for Space Science and Applications at Headquarters, checks out the final dry run of protocol for upcoming underwater tests of the Mark III and AX-5 zero pre-breathe Space Station suits during a recent visit to JSC. At left is Dr. Mike Greenisen, manager of the Anthropometrics and Biomechanics Laboratory, which is supporting the Crew and Thermal Systems Division's tests in Bldg. 29. In the baseline extravehicular mobility unit is Chuck Johnson.

President asks \$11.5 billion for NASA in '89

(Continued from page 1)

vanced X-Ray Facility. The request also provides for development of an advanced solid rocket motor for the Space Shuttle, continuation of the Civil Space Technology Initiative begun last year, and a strong program in aeronautics.

Fletcher said \$100 million requested for the Pathfinder Program will fund detailed studies and technology development to move human presence and activities beyond Earth orbit, a goal established in the President's new national space policy.

"It reflects a recognition of the realities of the crucial roles of science and technology to the nation's future," Fletcher said. "This is clearly not the time to freeze or cut back in this vital area."

JSC team pumps Nikes; wins 1988 Rodeo Run

A joint NASA-Air Force team "pumped Nikes" Feb. 20 to take first place in the 1988 Conoco 10K Rodeo Run.

The run, set to coincide with Houston rodeo activities, started at the corner of Texas Ave. and Main, and ran a straight 6.2 mile course to a finish line at the Astrodom.

Luis Rodriguez of the Air Force Detachment 2 at JSC organized the team of 18 runners. Early finishers flirted with the half-hour mark, while the maturing runners hovered more comfortably around one-hour even.

Rodriguez isn't new to the run organization game. "Anything for the NASA-Air Force team," he remarked.

In an effort to expand the role of the private sector, the budget request would allow NASA to procure needed expendable launch vehicle (ELV) services from the private sector whenever possible and to lease a major portion of a commercially developed space facility to be built by a private company.

Funding requested for JSC would pay for 3,460 full-time civil service employees, an increase of 120 or 3.6 percent over fiscal '88.

The construction budget for JSC includes \$9.2 million for an addition for the Space Systems Automated Integration and Assembly Facility, which will be referred to as Bldg. 9C and used for the development, testing and flight qualification of various Space Station hardware components. It includes \$4.9 million

to refurbish Bldg. 222, the Atmospheric Reentry Materials and Structures Evaluation Facility, which will include addition of a 12-foot diameter reentry environment vacuum test chamber. Also to be built for \$7.8 million is a new 2,000-square-foot Auxiliary Chiller Facility that will use two 2,000-ton chillers.

"The President has wisely given NASA the budget that's needed for fiscal '89," Fletcher said. "The budget recognizes the fact of life that total funding for NASA must increase substantially in fiscal '89. NASA has always enjoyed good bipartisan support in Congress. I'm confident that Congress, like the Administration, will recognize the importance of what we are doing and the built-in needs for the higher funding level that we have budgeted for fiscal '89."



BLACK HISTORY MONTH—Activist Dick Gregory receives a certificate of appreciation from Rose Mary Thompson (left), of Computer Sciences Corp., and program co-chairperson Donna Blackshear (center), during recent JSC Black History Month activities at the Gilruth Recreation Center. Gregory was one of several celebrities who participated in the month-long program.



Micki Wiesner, Donn Sickorez and Debbie Micale check out the training materials to be used when the new NASA Personnel Payroll System is put into agencywide use.

JSC Photo by Jack Jacob

Using the right approach helps

JSC to help spread uniform systems throughout agency

Over the next year and a half, JSC-developed training will help begin the spread of uniform institutional information systems throughout the agency.

For those who will be using such "everything to everybody" systems, it should be comforting to know that the education methods were developed using extensive input from employees just like them.

"If people can directly apply what they learn, they develop a positive attitude," said Micki Wiesner, leader of the team that developed the curriculum. "If we can help you overcome those kinds of frustrations on the job, you're going to be happy with the product—with the system—and maybe do your job better."

Wiesner, education administrator for the Data Processing Systems Division (DPSD), worked with Norris Taylor, development project manager for the NASA Personnel Payroll System (NPPS), and Computer Sciences Corp. employees Dr. Donn Sickorez and Debbie Micale to develop the prototype training program based on NPPS, one of the early efforts to use uniform systems for the agency's institutional tasks.

Uniform systems efforts began in 1984, when the associate administrator for management at Headquarters established the Automated Information Management Council (AIM) to review institutional information systems and provide policy and guidelines for agencywide uniform institutional information systems.

In November 1986, the AIM Council asked JSC's DPSD to use its experience with uniform systems to develop both a model to train individuals for future uniform systems and prototype training materials that could be used to help individuals who would be working with current uniform systems.

User Research

Wiesner and Taylor, who have worked together since the early 1960s, decided to mold the prototype training model

around the prototype NPPS system already being used in parallel with JSC's official personnel and payroll systems. Sickorez and Micale designed and developed the model from that idea and information provided by the AIM subcommittee on training. Micale spent "days on end" working with the payroll and personnel employees using the NPPS system at JSC to develop the training course and training materials.

The prototype training model will now be turned into a training model for the production version of NPPS. JSC employees who work with NPPS will be trained in the use of NPPS when it is put in place at JSC in the first quarter of fiscal year 1989. The JSC-developed training program then will be taken to a new NASA center every two months to teach workers at the other centers how to use NPPS. Within about a year and a half, all NASA centers should be trained in the use of NPPS.

If legislation changes necessitate changes in NPPS, the training program will be adjusted to reflect the changes. Likewise, any improvements that become visible as the training program spreads through NASA will be incorporated into the training.

"We will determine the best approach for those changes and the best delivery method," Wiesner said. "And that training is a continuous kind of process that will use this model as legislative changes are mandated."

Wide application

A generic version of the training model developed for NPPS will become part of a NASA Uniform Information Systems Training Model program plan that Headquarters uses for any uniform system that's developed.

"In other words, it's part of the bible for any uniform system at any center," Wiesner said.

The DPSD/CSC model takes a job-centered approach to training, concentrating on the job and the critical

tasks the user must perform with the system rather than on the system itself.

The model also separates the training into three categories to meet the specific needs of users at different levels.

Managers, who must know both the technical and end-user environments, receive a two- to three-hour overview. The end-users who add, make changes or view data, receive about half a day of training on how to navigate through the basic system. Technical leaders, who must know how to make changes to the system itself, and install and maintain code, receive about a day and a half of training.

Materials vary

Each area has special training requirements and the model addressed these. Information managers need high-level system information provided by a set of briefings and overview videotapes. For information entry personnel in the end-user area, hands-on skills sessions with the system were seen as the only viable option. For technical personnel, detailed technical materials were designed.

Since training requirements vary widely, the model also supports a number of delivery methods: stand-alone self study materials, briefings for information-only requirements, documentation and quick reference guides, hands-on classes for concept and skill development, and vendor requirements at the various user levels.

"I believe management will realize that training that is very job centered—concentrated on the critical tasks that employees need to do—accelerates the employees' ability to use office automation effectively and correctly," Wiesner said. "When they realize this, I think they will encourage their employees to attend training they need and demand that training is more customized to the job they do."

"If people can directly apply what they learn, they develop a positive attitude," said Micki Wiesner, leader of the team that developed the training. "If we can help you overcome those kinds of frustrations on the job, you're going to be happy with the product—with the system—and maybe do your job better."

THE PRESIDENT'S SPACE POLICY:

[Editor's note: The following are excerpts from a White House Office of the Press Secretary fact sheet that announced President Reagan's new space policy and commercial space initiative on Feb. 11.]

The President today announced a comprehensive "Space Policy and Commercial Space Initiative to Begin the Next Century" intended to assure United States space leadership.

The President's program has three major components:

- ★ Establishing a long-range goal to expand human presence and activity beyond Earth orbit into the Solar System;
- ★ Creating opportunities for U.S. commerce in space; and
- ★ Continuing our national commitment to a permanently manned Space Station.

The new policy and programs are contained in a National Security Decision Directive (NSDD) signed by the President on Jan. 5, 1988, the Fiscal Year 1989 Budget the President will submit shortly to Congress, and a 15 point Commercial Space Initiative.

Expanding human presence

In the recent NSDD, the President committed to a goal of expanding human presence and activity in the Solar system. To lay the foundation for this goal, the President will be requesting \$100 million in his FY 1989 Budget for a major new technology development program, "Project Pathfinder," that will enable a broad range of manned or unmanned missions beyond the Earth's orbit.

Project Pathfinder will be organized around four major focuses:

- ★ Exploration technology;
- ★ Operations technology;
- ★ Humans-in-space technology; and
- ★ Transfer vehicle technology.

This research effort will give the United States know-how in critical areas such as humans in the space environment, closed loop life support, aerobraking, orbital transfer and maneuvering, cryogenic storage and handling, and large-scale space operations, and provide a base for wise decisions on long-term goals and missions.

Creating space commerce

The President is announcing a 15-point commercial space initiative to seize the opportunities for a vigorous U.S. commercial presence in Earth orbit and beyond—in research and manufacturing. This initiative has three goals:

- ★ Promoting a strong U.S. commercial presence in space;
- ★ Assuring a highway to space; and
- ★ Building a solid technology and talent base.

Private Sector Space Facility: The President is announcing an intent for the federal government to lease space as an "anchor tenant" in an orbiting space facility suitable for research and commercial manufacturing that is financed, constructed, and operated by the private sector. The administration will solicit proposals from the U.S. private sector for such a facility. Space in this facility will be used and/or subleased by various federal agencies with an interest in microgravity research.

The administration's intent is to award a contract during mid-summer of this year for such space and related services to be available to the government no later than the end of FY 1993.

Spacehab: The administration is committing to make best efforts to launch within the Shuttle payload bay, in the early 1990s, the commercially developed, owned, and managed Shuttle middeck module: Spacehab. Manifesting requirements will depend on customer demand.

Spacehab is a pressurized metal cylinder that fits in the Shuttle payload bay and connects to the crew compartment through the Orbiter airlock. Spacehab takes up approximately one-quarter of the payload bay and increases the pressurized living and working space of an Orbiter by approximately 1,000 cubic feet or 400 percent in usable research volume. The facility is intended to be ready for commercial use in mid-1991.

Microgravity Research Board: The President will establish, through Executive Order, a National Microgravity Research Board to assure and coordinate a broader range of opportunities for research in microgravity conditions.

NASA will chair this board, which will include senior-level representatives from the Departments of Commerce, Transportation, Energy, and Defense, NIH, and NSF; and will consult with the university and commercial sectors. The board will have the following responsibilities:

- ★ To stimulate research in microgravity environments and its applications to commercial uses by advising federal agencies, including NASA, on microgravity priorities, and consulting with private industry and academia on microgravity research opportunities;

- ★ To develop policy recommendations to the federal government on matters relating to microgravity research, including types of research, government/industry/and academic cooperation, and access to space, including a potential launch voucher program;

- ★ To coordinate the microgravity programs of federal agencies by reviewing agency plans for microgravity research and recommending priorities for the use of federally owned or leased space on microgravity facilities; and ensuring that agencies establish merit review processes for evaluating microgravity research proposals; and

- ★ To promote transfer of federally funded microgravity research to the commercial sector.

NASA will continue to be responsible for making judgments on the safety of experiments and for making manifesting decisions for manned space flight systems.

External Tanks: The Administration is making available for five years the expended external tanks of the Shuttle fleet at no cost to all feasible U.S. commercial and nonprofit endeavors, for uses such as research, storage, or manufacturing in space.

NASA will provide any necessary technical or other assistance to these endeavors on a direct cost basis. If private sector demand exceeds supply, NASA may auction the external tanks.

Privatizing Space Station: NASA, in coordination with the Office of Management and Budget, will revise its guidelines on commercialization of the U.S. Space Station to clarify and strengthen the federal commitment to private sector investment in this program.

Future Privatization: NASA will seek to rely to the greatest extent feasible on private sector design, financing, construction, and operation of future Space Station requirements, including those currently under study.

Remote Sensing: The Administration is encouraging the development of commercial remote sensing systems. As part of this effort, the Department of Commerce, in consultation with other agencies, is examining potential opportunities for future federal procurement of remote sensing data from the U.S. commercial sector.

Assuring a highway to space

Reliance on Private Launch Services: Federal agencies will procure existing and future required expendable launch services directly from the private sector to the fullest extent feasible.

Insurance Relief for Launch Providers: The Administration will... address the insurance concerns of the U.S. commercial launch industry, which currently uses federal launch ranges. These steps include:

- ★ **Limits on Third Party Liability:** Consistent with the Administration's tort policy, the Administration will propose to Congress a \$200,000 cap on noneconomic damage awards to individual third parties resulting from commercial launch accidents;

- ★ **Limits on Property Damage Liability:** The liability of commercial launch operators for damage to government property resulting from a commercial launch accident will be administratively limited to the level of insurance required by the Department of Transportation.

If losses to the government exceed this level, the government will waive its right to recover for damages. If losses are less than this level, the government will waive its right to recover for those damages caused by government willful misconduct or reckless disregard.

Private Launch Ranges: The Administration will consult with the private sector on the potential construction of commercial launch range facilities separate from federal facilities and the use of such facilities by the federal government.

Vouchers for Research Payloads: NASA and the Department of Transportation will explore providing to research payload owners manifested on the Shuttle a one-time launch voucher that can be used to purchase an alternative U.S. commercial launch service.

Technology and talent base

Space Technology Spin-Offs: The President is directing that the new Pathfinder program, the Civil Space Technology Initiative, and other technology programs be conducted in accordance with the following policies:

- ★ Federally funded contractors, universities, and federal laboratories will retain the rights to any patents and technical data, including copyrights, that result from these programs. The federal government will have the authority to use this intellectual property royalty free;

- ★ Proposed technologies and patents available for licensing will be housed in a Pathfinder/CSTI library within NASA; and

- ★ When contracting for commercial development of Pathfinder, CSTI and other technology work products, NASA will specify its requirements in a manner that provides contractors with maximum flexibility to pursue innovative and creative approaches.

Federal Expertise on Loan to American Schools: The President is encouraging federal scientists, engineers, and technicians in aerospace and space-related careers to take a sabbatical year to teach in any level of education in the United States.

Education Opportunities: The President is requesting in his FY 1989 Budget expanding five-fold opportunities for U.S. teachers to visit NASA field centers and related aerospace and university facilities.

In addition, NASA, NSF, and DOD will contribute materials and classroom experiments through the Department of Education to U.S. Schools developing "tech shop" programs. NASA will encourage corporate participation in this program.

Protecting U.S. Critical Technologies: The administration is requesting that Congress extend to NASA the authority it has given the Department of Defense to protect from wholesale release under the Freedom of Information Act those critical national technologies and systems that are prohibited from export.

Space Station commitment

In 1984, the President directed NASA to develop a permanently manned Space Station. The President remains committed to achieving this end and is requesting \$1 billion in his FY 1989 Budget for continued development and a three year appropriation commitment from Congress for \$6.1 billion. The Space Station, planned for development in cooperation with U.S. friends and allies, is intended to be a multi-purpose facility for the Nation's science and applications programs. It will permit such things in space as: research, observation of the solar system, assembly of vehicles or facilities, storage, servicing of satellites, and basing for future space missions and commercial and entrepreneurial endeavors in space.

To help ensure a Space Station that is cost effective, the President is proposing as part of his Commercial Space Initiative actions to encourage private sector investment in the Space Station, including directing NASA to reply to the greatest extent feasible on private sector design, financing, construction, and operation of future Space Station requirements.

Additional highlights

- ★ **U.S. Space Leadership:** Leadership is reiterated as a fundamental national objective in areas of space activity critical to achieving

U.S. national security, scientific, economic and foreign policy goals.

- ★ **Defining Federal Roles and Responsibilities:** Government activities are specified in three separate and distinct sectors: civil, national security, and nongovernmental. Agency roles and responsibilities are codified and specific goals are established for the civil space sector; those for other sectors are updates.

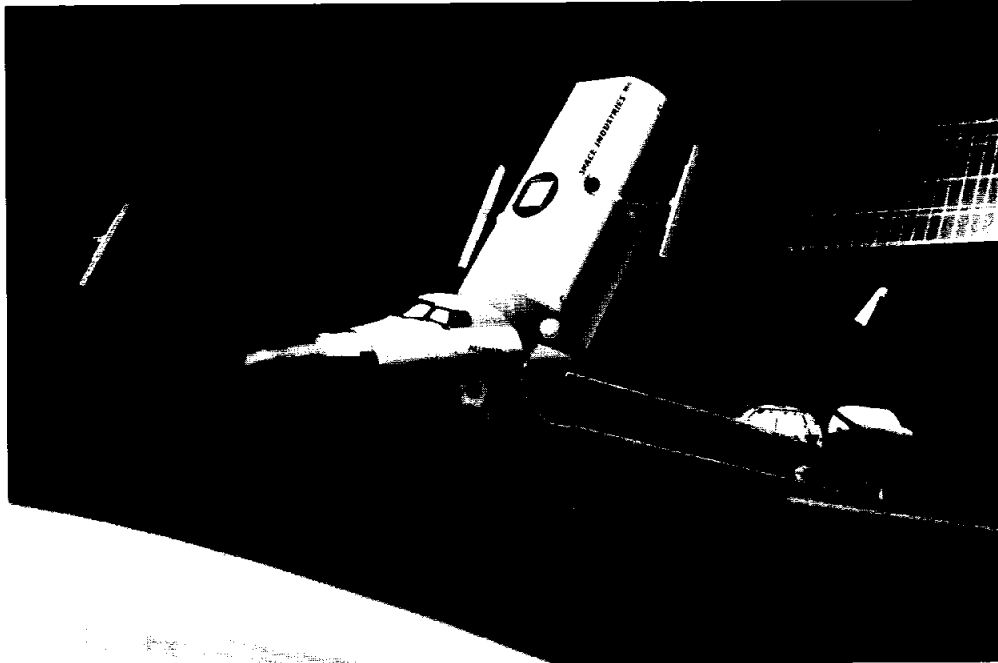
- ★ **Encouraging a Commercial Sector:** A separate, nongovernmental or commercial space sector is recognized and encouraged by the policy that federal government actions shall not preclude or deter the continuing development of this sector. New guidelines are established to limit unnecessary government competition with the private sector and ensure that federal agencies are reliable customers for commercial space goods and services.

- ★ **The President's launch policy prohibiting NASA from maintaining an expendable launch vehicle adjunct to the Shuttle, as well as limiting commercial and foreign payloads on the Shuttle to those that are Shuttle-unique or serve national security or foreign policy purposes, is reaffirmed. In addition, policies endorsing the purchase of commercial launch services by federal agencies are further strengthened.**

- ★ **National Security Space Sector:** An assured capability for national security missions is clearly enunciated, and the survivability and endurance of critical national security space functions is stressed.

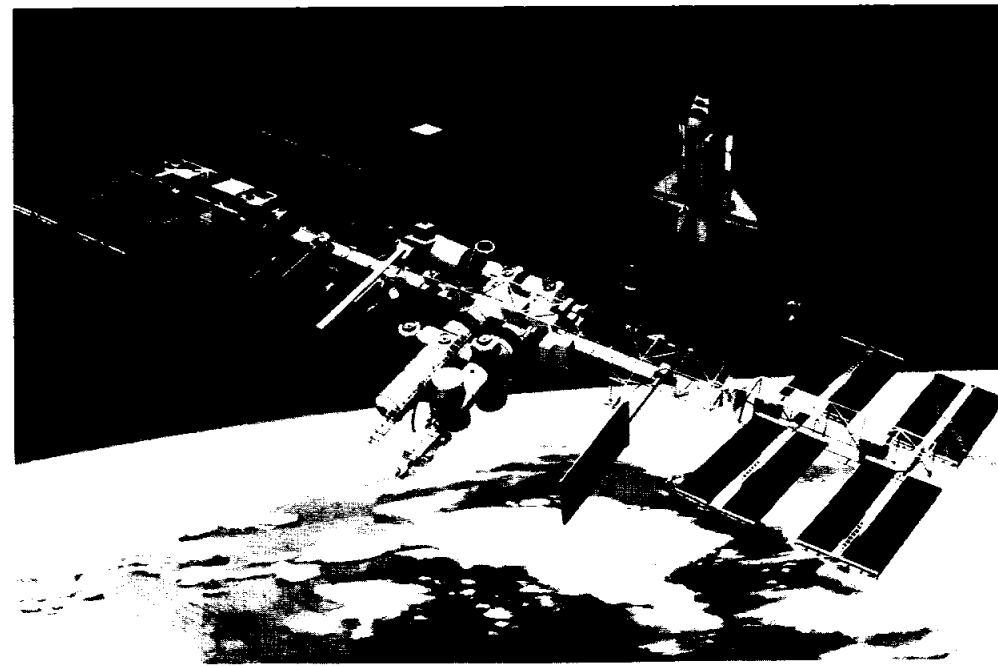
- ★ **Assuring Access to Space:** Assured access to space is recognized as a key element of national space policy. U.S. space transportation systems that provide sufficient resiliency to allow continued operation, despite failures in any single system, are emphasized. The mix of space transportation vehicles will be defined to support mission needs in the most cost effective manner.

- ★ **Remote Sensing:** Policies for federal "remote sensing" or observation of the Earth are established to encourage the development of U.S. commercial systems competitive with or superior to foreign-operated civil or commercial systems.



Space Industries Inc. Photo

The President's new space policy announces the federal government's intent to be an "anchor tenant" in a private orbiting space facility suitable for research and commercial manufacturing. Above is Space Industries Inc.'s concept of a man-tended facility.



NASA Photo

The President's announcement reasserts his commitment to establishing a permanently manned Space Station, requesting a three year, \$6.1 billion commitment from Congress.

New directive establishes broad framework to guide future space activities; requires more cooperation among government agencies, commercial sector

[Editor's note: The following are excerpts from a White House Office of the Press Secretary fact sheet on the Presidential Directive on National Space Policy.]

The President approved on Jan. 5, 1988, a revised national space policy that will set the direction of U.S. efforts in space for the future. The policy is the result of a five-month interagency review which included a thorough analysis of previous Presidential decisions, the National Commission on Space report, and the implications of the Space Shuttle and expendable launch vehicle accidents. The primary objective of this review was to consolidate and update Presidential guidance on U.S. space activities to provide a broad policy framework to guide U.S. space activities well into the future.

The resulting Presidential Directive reaffirms the national commitment to the exploration and use of space in support of our national well being. It acknowledges that United States space activities are conducted by three separate and distinct sectors: two strongly interacting governmental sectors (Civil, and National Security) and a separate, non-governmental Commercial Sector. Close coordination, cooperation, and technology and information exchange will be maintained among sectors to avoid unnecessary duplication and promote attainment of United States space goals.

Goals and objectives

The directive states that a fundamental objective guiding United States space activities has been, and continues to be, space leadership. Leadership in an increasingly competitive international environment does not require United States preeminence in all areas and disciplines of space enterprise. It does require United States preeminence in key areas of space activity critical to achieving our national security, scientific, technical, economic, and foreign policy goals.

The overall goals of United States space activities are: 1) to strengthen the security of the United States; 2) to obtain scientific, technological, and economic benefits for the general population and to improve the quality of life on Earth through space-related activities; 3) to encourage continuing United States private-sector investment in space and related activities; 4) to promote international cooperative activities taking into account United States national security, foreign policy, scientific, and economic interests; 5) to cooperate with other nations in maintaining the freedom of space for all activities that enhance the security and welfare of mankind; and, as a long-range goal, 6) to expand human presence and activity beyond Earth orbit into the solar system.

The directive states that United States space activities shall be conducted in accordance with the following principles:

- ☆ The United States is committed to the exploration and use of outer space by all nations for peaceful purposes and for the benefit of all mankind. "Peaceful purposes" allow for activities in pursuit of national security goals.
- ☆ The United States will pursue activities in space in support of its inherent right of self-defense and its defense commitments to its allies.
- ☆ The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitations on the fundamental right of sovereign nations to acquire data from space.
- ☆ The United States considers the space systems of any nation to be national property with the right of passage through and operations in space without interference. Purposeful interference with space systems shall be viewed as an infringement on sovereign rights.
- ☆ The United States shall encourage and not preclude the commercial use and exploitation

of space technologies and systems for national economic benefit without direct federal subsidy. These commercial activities must be consistent with national security interests, and international and domestic legal obligations.

☆ The United States shall encourage other countries to engage in free and fair trade in commercial space goods and services.

The United States will conduct international cooperative space-related activities that are expected to achieve sufficient scientific, political, economic, or national security benefits for the nation. The United States will seek mutually beneficial international participation in its space and space-related programs.

Civil space policy

☆ The United States civil space sector activities shall contribute significantly to enhancing the nation's science, technology, economy, pride, sense of well-being and direction, as well as United States world prestige and leadership. Civil sector activities shall comprise a balanced strategy of research, development, operations, and technology for science, exploration, and appropriate applications.

☆ The objectives of the United States civil space activities shall be 1) to expand knowledge of the Earth, its environment, the solar system, and the universe; 2) to create new opportunities for use of the space environment through the conduct of appropriate research and experimentation in advanced technology and systems; 3) to develop space technology for civil applications and, wherever appropriate, make such technology available to the commercial sector; 4) to preserve the United States preeminence in critical aspects of space science, applications, technology, and manned space flight; 5) to establish a permanently manned presence in space; and 6) to engage in international cooperative efforts that further United States space goals.

Commercial space policy

The United States government shall not preclude or deter the continuing development of a separate, non-governmental Commercial Space Sector. Expanding private sector investment in space by the market-driven Commercial Sector generates economic benefits for the Nation and support governmental Space Sectors with an increasing range of space goods and services. Governmental space sectors shall purchase commercially available space goods and services to the fullest extent feasible and shall not conduct activities with potential commercial applications that preclude or deter Commercial Sector space activities except for national security or public safety reasons. Commercial Sector space activities shall be supervised or regulated only to the extent required by law, national security, international obligations, and public safety.

National security space policy

The United States will conduct those activities in space that are necessary to national defense. Space activities will contribute to national security objectives by 1) deterring, or if necessary, defending against enemy attack; 2) assuring that forces of hostile nations cannot prevent our own use of space; 3) negating, if necessary, hostile space systems; and 4) enhancing operations of United States and Allied forces. Consistent with treaty obligations, the

national security space program shall support such functions as command and control, communications, navigation, environmental monitoring, warning, and surveillance (including research and development programs which support these functions).

Implementing procedures

To provide a forum to all federal agencies for their policy views, to review and advise on proposed changes to national space policy, and to provide for orderly and rapid referral of space policy issues to the President for decisions as necessary, a Senior Interagency Group (SIG) on Space shall continue to meet. The SIG(Space) will be chaired by a member of the National Security Council staff and will include appropriate representatives of the Department of State, Department of Defense, Department of Commerce, Department of Transportation, Director of Central Intelligence, Organization of the Joint Chiefs of Staff, United States Arms Control and Disarmament Agency, the National Aeronautics and Space Administration (NASA), Office of Management and Budget, and the Office of Science and Technology Policy. Other Executive agencies or departments will participate as the agenda of meeting shall dictate.

Civil space sector guidelines

In conjunction with other agencies, NASA will continue the lead role within the federal government for advancing space science, exploration, and appropriate applications through the conduct of activities for research, technology, development, and related operations; the National Oceanic and Atmospheric Administration will gather data, conduct research, and make predictions about the Earth's environment; DOT will license and promote commercial launch operations which support civil sector operations.

☆ Space Science. NASA, with the collaboration of other appropriate agencies, will conduct a balanced program to support scientific research, exploration, and experimentation to expand understanding of: 1) astrophysical phenomena and the origin and evolution of the universe; 2) the Earth, its environment and its dynamic relationship with the Sun; 3) the origin and evolution of the solar system; 4) fundamental physical, chemical, and biological processes; 5) the effects of the space environment on humans and 6) the factors governing the origin and spread of life in the universe.

☆ Space Exploration. In order to investigate phenomena and objects both within and beyond the solar system. . . NASA will conduct a balanced program of manned and unmanned exploration.

☆ Human Exploration. To implement the long-range goal of expanding human presence and activity beyond Earth orbit into the solar system the policy directs NASA to begin the systematic development of technologies necessary to enable and support a range of future missions. This technology program (Pathfinder) will be oriented toward a Presidential decision on a focused program of manned exploration of the solar system.

☆ Unmanned Exploration. The policy further directs NASA to continue to pursue a program of unmanned exploration where such exploration can most efficiently and effectively satisfy national space objectives by among other things: achieving scientific objectives where human presence is undesirable or unnecessary; exploring realms where the risks or costs of life support are unacceptable; and providing data vital to support future manned missions.

☆ Permanent Manned Presence. . . . NASA will develop the Space Station to achieve permanently manned operational capability by the mid-1990s. The directive further states that the Space Station will: 1) contribute to United States preeminence in critical aspects of manned spaceflight; 2) provide support and stability to scientific and technological investigations; 3) provide early benefits, particularly in the materials and life sciences; 4) promote private sector experimentation preparatory to independent commercial activity; 5) allow evolution in keeping with the needs of Station users and the long-term goals of the United States; 6) provide opportunities for commercial sector participation; and 7) contribute to the longer term goal of expanding human presence and activity beyond Earth orbit into the solar system.

☆ Manned Spaceflight Preeminence. The directive specifies that approved programs such as efforts to improve the Space Transportation System (STS) and return it to safe flight and to develop, deploy, and use the Space Station, are intended to ensure United States preeminence in critical aspects of manned spaceflight.

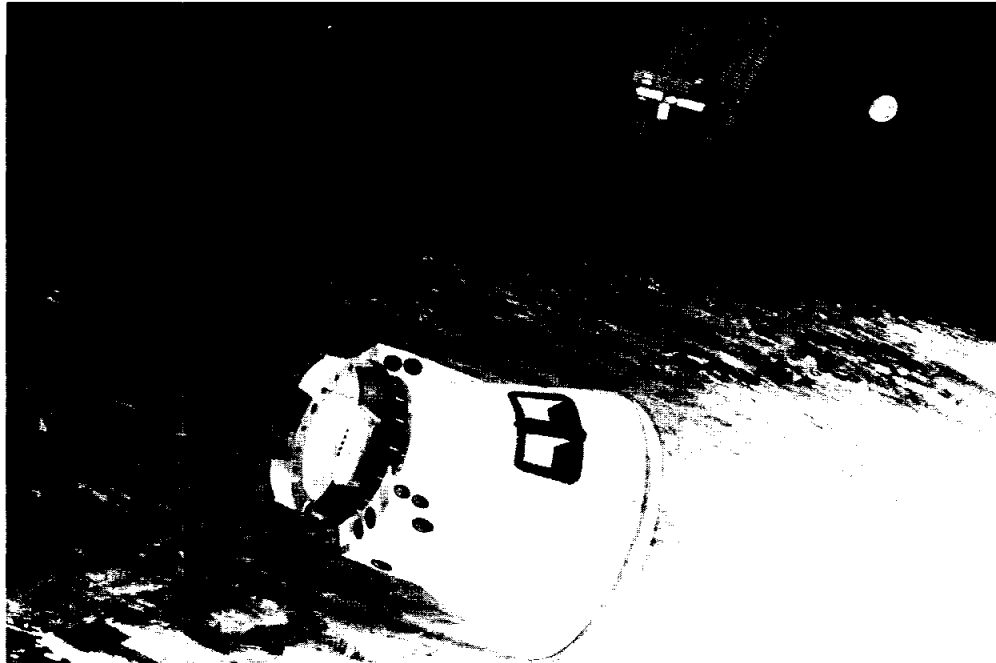
☆ Space Applications. The policy directs NASA and other agencies to pursue the identification and development of appropriate applications flowing from their activities. Agencies will seek to promote private sector development and implementation of applications.

☆ Civil Government Space Transportation. The policy states the unique Space Transportation System capability to provide manned access to space will be exploited in those

areas that offer the greatest national return, including contributing to United States preeminence in critical aspects of manned spaceflight. The STS fleet will maintain the nation's capability and will be used to support critical programs requiring manned presence and other unique STS capabilities. In support of national space transportation goals, NASA will establish sustainable STS flight rates to provide for planning and budgeting of government space programs. NASA will pursue appropriate enhancements to STS operational capabilities, upper stages, and systems for deploying, servicing, and retrieving spacecraft as national user requirements are defined.

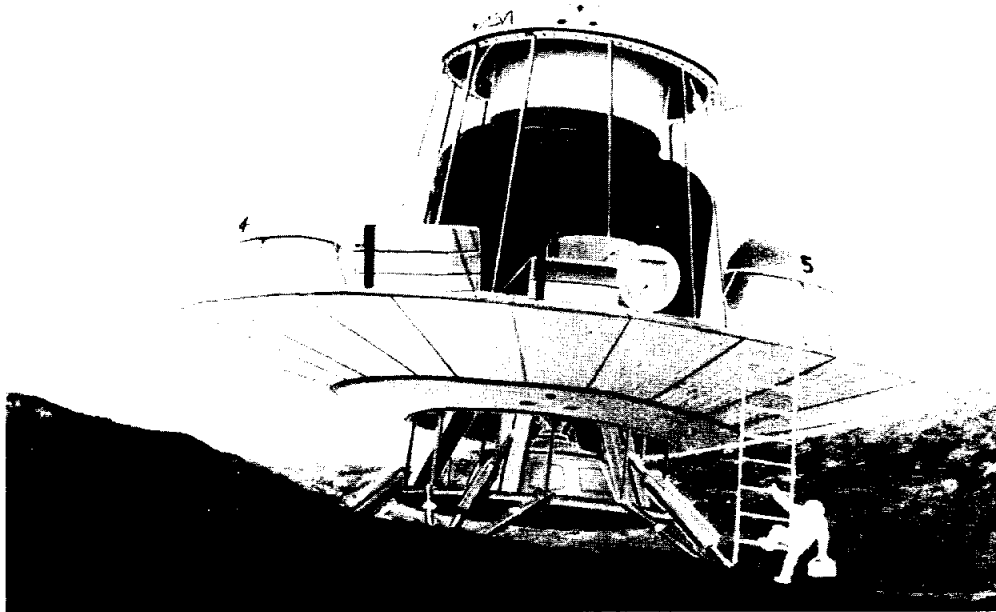
☆ International Cooperation. The policy guidelines state that the United States will foster increased international cooperation in civil space activities by seeking mutually beneficial international participation in its civil space and space-related programs. The SIG(Space) Working Group on Space Science Cooperation with the U.S.S.R. shall be responsible for oversight of civil space cooperation with the Soviet Union. No such cooperative activity shall be initiated until an interagency review has been completed. . . . United States cooperation in international civil space activities will: be consistent with United States technology transfer laws, regulation, Executive Orders and presidential directives; support the public, non-discriminatory direct readout of data from federal civil systems to foreign ground stations and the provision of data to foreign users under specified conditions; and be conducted in such a way as to protect the commercial value of intellectual property developed with federal support. Such cooperation will not preclude or deter commercial space activities by the United States private sector, except as required by national security or public safety.

NASA, and the Departments of Commerce, Defense, and Transportation will work cooperatively to develop and implement specific measures to foster the growth of private sector commercial use of space. A high-level focus for commercial space issues has been created through establishment of a Commercial Space Working Group of the Economic Policy Council. SIG(Space) will continue to coordinate the development and implementation of national space policy.



JSC Photo

Space transportation policy goals enunciated in the Presidential directive begin with achieving and maintaining safe and reliable access to, transportation in and return from, space. Above is an artist's concept of one of several designs being considered for a Crew Emergency Return Vehicle on the Space Station.



JSC Photo

NASA is directed to begin systematic development of technologies necessary to enable and support a range of future manned missions. Above is an artist's concept of a Mars lander that would utilize aerobraking technology.

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: Egret Bay condo, 1-1-2, upgraded carpet, wallpaper, fans, ceramic tile, close to NASA, \$350/mo. Pam, 282-4402 or 488-7551.

Sale: Friendswood, Galveston county, 3-2, fenced yard, Friendswood school district, \$45,900. Jeff, 282-7744 or 996-1907.

Sale/lease: University Trace townhouse, 2-2.5-2, all appliances, FPL, security system, \$46,000, take over loan, 9.5%. 333-4044.

Lease: 2-2.5.1 townhouse, 1,500 sq. ft., FPL, garage, near NASA 1 & El Camino. x37008 or 452-3361.

Sale: I-45 south, FM 517, 3-2-2, 1 acre, FPL, built-in range, oven, dishwasher, disposal, compactor, fans, miniblinds, shed, pool, pond, \$68,500 OBO. 337-2680.

Lease: Medical Center, 2 story townhouse, 2-2.5-2, microwave, refrig., W/D, alarm system, garage, jacuzzi, 24 hr. security, extras, no pets, \$750/mo. x31538 or 748-5044.

Lease: Heritage Park, 3-2-2, on cul-de-sac, appliances, near Alameda Mall, \$525/mo. Sam, x32151 or 337-3683.

Sale: Friendswood, 3-2-2, large covered patio. 482-3697.

Sale: Pearlard Park, mobile home, 3-1.5, 14' x 70', miniblinds, appliances, skirted, appraised, \$12,500, sell, \$7,500. Michael, 280-7344 or 485-5339.

Sale: '85 Mallard motor home, 35', \$37,000. D. Long, 337-4051.

Sale: Big Bend land, 160 acres, \$70/acre. D. Long, 337-4051.

Sale: Friendswood/Sun Meadows Estates, wooded lot, cul-de-sac, bordered by stream, golf course on 2 sides, 210' deep. Doug, x32860 or 486-7412.

Lease: Bay cottage, furnished, boat storage/ramp, utilities, adults only, no pets, \$100 deposit, \$200 weekly, special monthly rates. 339-2450.

Sale: 45 acres or 3 15-acre tracts, gently rolling hills, partially wooded, deer, spring water, on private black top road, all utilities, next to retired Vale Blackshear, Joe Rangel, near Palestine, TX. Joe Guerrero, (214) 729-8458 collect.

Lease: Mobile home lot, \$85/mo., \$50 deposit, Bakerandkinne, Bacliff. 488-1758.

Sale: Kirkwood South, 4-2.5-2, custom 2 story, formals, family room, FPL, intercom, walk-in closets, new 4-ton AC, oversized cul-de-sac lot, \$81,500. Al, 488-5210.

Lease: El Lago, Pebblebrook condo, 1 BR, W/D, fan, new carpet, pool, tennis, 10 min. from NASA. Aggie or Chris, (409) 925-8593.

Lease: Lake Livingston waterfront house, 3-2, furnished, pier, ex. fishing, skiing, swimming, weekend, weekly rates. 482-1582.

Sale: '80 mobile home, 2-1, 14' x 56', AC, ex. cond., owner finance 13%, \$127/mo. Scott, x37115 or 485-4364.

Lease: Crystal Beach beachfront house, large screened porch, large deck, sleeps 8, 2 bath, A/H, everything furnished except linens, weekly \$550, weekend \$275. M. Edwards, 282-4017 or 488-2681.

Sale: Crystal Beach, beach house, two lots, private BR, 2 bath, FPL, large deck, large screened porch, utility room, storage, new carpet. M. Edwards, 282-4017 or 488-2681.

Sale: League City/Newport, 4-BR house, ranch style, corner lot, new carpet, appliances, FPL, large storage shed, fenced, \$67,400. Fred, 554-6490.

Lease: Nassau Bay, Bayfront Towers condo, 1 BR, fully furnished, \$550/mo. Booker, x30952 or 486-4070.

Sale: 3.29 acres, 1 BR cottage, den, hardwood floors, new roof, new carpet, FPL, carport, storage, 5 min. from NASA in Seabrook, \$97,000. 532-4784.

Sale: Friendswood, wooded lot, on cul-de-sac, near shopping, schools, \$16,900 or \$195/mo. 488-3224.

Lease: Baywind II condo, split level, cathedral ceiling, 1 BR, FPL, patio, balcony, W/D conn., \$300/mo. Ms. Martell, 643-5567.

Sale/Lease: Baywind I condo, 2-1.5-2, W/D, new paint, \$325/mo., electric, deposit, sell for appraised value. 333-3992.

Lease: Seabrook, frame house on Todville Rd., 2 loft BR, 1 bath, W/D, A/H, partially furnished, fenced, \$500/mo. Mary, x32713.

Sale: Tri-level house on 75' x 150' lot, overlooks Taylor Lake, attached complete apartment, extras. 474-3181.

Lease: Friendswood, Forest Bend, 3-2-2, new paint, FPL, refrig., patio, fenced, \$495/mo. 482-6609.

Sale: CLC, 3-2-2, broker-owner, new vinyl flooring, stain master carpet, FPL, fans, remodeled kitchen, microwave, custom cabinets, screened patio, built-in gas grill, located on park, near Whitcomb Elementary, \$68,000. x30020

or 488-5390.

Lease: West Galveston Island beach house, 3-2, A/H, day/week/mo. rates. Ed Shumilak, x37686 or (409) 744-1376.

Lease: 2-2 condo, 950 sq. ft., W/D conn., near day care, fan, pools, low deposit, \$330/mo. 280-9822.

Lease: Mobile home lot, 920 Baker Bacliff, \$85/mo., \$50 deposit. 488-1758.

Sale: 420 acres, 1 mi. outside Center, TX, 300 Timber, 120 acres pasture land, 1/2 mineral rights. x38334 or 482-4365.

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

Cars & Trucks

'83 Datsun Pulsar NX, loaded, new tires, battery, brakes, 57K mi., 2-tone blue, ex. cond., \$3,900. 538-1415.

'87 Mitsubishi Mirage, 4 dr., 13K mi., \$9,800. 479-7531.

'71 Olds Cutlass, orig. owner, all records, 155K mi., need trans. seal, paint. BO. 499-5786.

'84 Chevy S10 pickup, V6, auto., overdrive, AC, bedliner, AM/FM/tape, 39K mi., \$5,100. Plauchoe, x39034 or 474-2660.

'86 Delta Royale, 3.8L F.I., tilt, cruise, electric, maroon, \$9,800 OBO. Ray, x30823 or 554-5434.

'86 Supra, red, gray leather interior, loaded, ex. cond., \$16,000. Mike, x33280 or 474-4805.

'83 Honda Civic station wagon, loaded, \$2,600 OBO. 486-1110.

'77 Honda Accord, \$800 OBO. 486-1110.

'84 Dodge Pickup, D-150, loaded, good cond., \$4,500. John Mosler, x32236.

'82 Fiat Spider convertible, ivory/tan, AC, 5 spd., AM/FM/tape, 48K mi., \$4,100. 326-2566.

'85 Dodge Ram mini-cargo van, auto., AC, PS, PB, tilt, AM/FM, 2.6 liter, 4 cyl., new tires, battery, struts, slight rail damage, ex. cond., maroon, \$4,950. 472-3728.

'79 Olds 88 Brougham, 4 dr., diesel, new tires, battery, diesel pump, \$1,350 OBO. Robert Oppelt, 472-6323.

'85 GMC Jimmy, 2 wheel drive, AC, auto., all power, 39K mi., 2 tone, ex. cond., \$7,900. 474-4712.

'71 Ford wagon, 400 V-8, 127K mi., CD ignition, manuals, hitch, \$550. Brown, x31604 or 333-3103.

'81 Ford E-250 Maxi Van, 351-V8, dual air, 4 captain chairs, rear bench converts to bed, 71K mi., AM/FM, ex. cond., \$7,900. x33124 or 482-1348.

'85 Wilderness Travel Trailer, 25' style N, sleeps 5, ex. cond., \$7,800. x33124 or 482-1348.

'83 Mercury Cougar, 6 cyl., auto., AC, AM/FM, ex. cond., \$4,800. Barbara, 482-1275 or 333-3976.

'86 Chevrolet Camaro, T-tops, tinted windows, V8 auto., gray, black interior, \$9,000. 280-2106 or 333-3659.

'84 Ford Thunderbird Elan, 302 V-8, loaded, overdrive, positrack, premium sound, alarm, 54K mi., ex. cond. Bob, x33239 or 485-1239.

'81 Chevrolet Caprice, 305 V-8, extras, 74K mi., ex. cond. Bob, x33239 or 485-1239.

'83 Mercury Cougar, 6 cyl., tinted windows, electric windows, AC, AM/FM, 56K mi. Kay, x34845 or 331-3379.

'79 280 ZX, 5 spd., removable sunroof, tinted windows, louvers for back and side windows, AM/FM/tape, AC, new clutch, brakes, slight left fender damage, will supply new fender, 68K mi., \$3,295. Kay, x34845 or 351-3379.

'76 Chevrolet S/W, dependable, fair tires, needs brakes. 333-3992.

'67 Mustang, 3 spd., Z89-V8, new paint, AM/FM, good tires, air shocks, headers, good cond., \$2,995. Michael, x38169 or 482-8496.

'74 Plymouth Duster, needs engine work, \$150 OBO. 538-2299.

'80 Pontiac Bonneville, 4 dr., V6, blue, \$2,695. 480-1218.

'78 Porsche 928, 5 spd., 49K mi., ex. cond., \$12,500. David, x34202 or 559-2850.

'75 Ford LTD, 2 dr., \$300. Jim, x38321 or 334-4631.

'79 Dodge Aspen, 6 cyl., 3 spd., good tires, muffler, \$500 OBO. x39007 or 480-4918.

'86 Bronco II, 4 x 4, auto., AC, AM/FM, warranty, \$9,500 OBO. x32163 or 996-8011.

'80 Kawasaki LTD, 500 cc, under 4K original mi., \$950 OBO. David, x33109 or 480-1576.

'87 Hyundai Excel SE, 4 dr., AC, sound system, 5 spd., alloy wheels, 1 owner, \$87,000. David, 644-0861 or 480-5132.

'76 Ford Maverick, 2 dr., 250 cu. in. engine, 90K mi., PS, PB, auto., AM/FM/tape, good mechanical cond., \$795. John, x34480 or 480-3201.

'75 Toyota Pickup longbed, rebuilt engine, new tires, new parts, \$1,250. Mike, 488-1998.

'73 Chevrolet Cheyenne C-10 Pickup, 1.5 ton, AT, PS, PB, AC, AM/FM/tape, 2 new Michelins, good mechanical cond., some rust, service manual, 140K mi., 1 owner, \$1,300. John, x31056.

'80 Audi 4000 Coupe, 1 owner, new CV joints, clutch, AC, Sony AM/FM/tape, good cond., \$2,195. 480-4548.

'82 Granada GL, new radials, cruise, AC, AM/FM, wire wheels, 48K mi., 2 toned, ex. cond., \$3,995. 480-4548.

Cycles

'85 Suzuki GS 700E, red/white, ex. cond., 2,500 mi., \$1,995. John, x36484 or 486-1186.

'81 Yamaha XJ550, 9K mi., alarm, cover, ex. cond., Nava and Fulmer helmets, \$1,500. Joe, x46894 or 480-4775.

'82 Yamaha 650 Heritage special, new tires, new exhaust system, \$900 OBO. Jim, x31793 or 280-0681.

'81 wetbike, \$1,000; tilt trailer, \$250. 486-5024.

'82 Yamaha SECA 650, 5,500 mi., windscreen rack, ex. cond., \$990. Tony England, x32787.

Boats & Planes

15' Ebbtide, 50 hp engine, big wheel sportsman trailer, good cond., \$1,800. x37536 or (409) 945-0998.

14' catamaran, multicolor sail, trailer, full accessories, \$1,400 OBO. 334-6081.

Coronado 15 sailboat, 3 sails, rigged for racing, jib track, trapeze, tiller extension, galvanized trailer, 41,200. 280-7413 or 474-7935.

'83 Hobie 16 catamaran, orange rainbow sail, trailer, ex. cond., \$2,300. x35067 or 333-3544.

'85 Renken 19'7" cuddly cabin, 170hp V-6 OMC, shorelander drive on trailer, payoff \$8,900, no down payment. Mike, x33280 or 474-4805.

16' Ski boat, 75 hp Johnson, tilt, tow bar, new paint, 4 new seats, instruments, carpet, AM/FM, galvanized trailer, ski included, \$3,500. Ben, x31588.

'84 Wellcraft 18' fisherman w/150 hp Yamaha and Sportsman trailer, white line chart recorder, flash sounder, VHF radio & antenna, 2 batteries, live well, swim platform, extras, \$10,000. Steve, x32460 or 482-3696.

Audiovisual & Computer

Apple II+ computer, disk drive, monitor, RF mod, robot arm, software, \$410. 334-6081.

Internal Modem for Tandy 1000EX computer, 1200 Baud, 2 mos. old, was \$217, now \$149. Terry, 280-2043 or 930-8042.

Commodore 64 computer, monitor, printer, disk drive, \$185. Gayle, 996-9690.

Ashton Tate's D-base for MacIntosh, new, \$250. Susan, 280-8006.

Commodore 64k, disk drive, printer, \$300. Jim, x31793 or 280-0681.

63 watt power supply for IBM PC, IBM original, \$25. Jim Bates, x31347 or 944-4687.

Household

L-shaped sofa, 2 pieces, matching recliner, tan, ex. cond., Kari, BO. x35111 or 488-8919.

King-sized waterbed, full motion mattress, bookshelf and mirror headboard, ivory lacquer finish, accessories. 554-2294.

Early American couch and chair, brown and gold, good cond., \$100. 486-7003 or 333-6387.

Ward's 19" color TV, 4 yrs. old, good cond., \$50 OBO. Don, x39036 or 482-3820.

Kenmore washer, harvest gold, good cond., \$100. 331-8310.

Full-sized Magic Chef microwave, \$75. Lea Anne, 486-6762.

Couch, pillow back, navy w/small white dots, ex. cond., free delivery, \$125. Chuck, x34241 or 487-4241.

Refrigerator, 3 dr., frostfree, 24 cubic ft., ice maker, \$325, ex. cond. 486-5024.

Sofa/sleeper, love seat, light blue, neutral tones, \$350 OBO; dining table w/6 chairs, \$100; glass/brass dinette, 2 chairs, \$60; 9-drawer dresser, mirror, \$100; student desk, \$30. Mike, x34535 or 480-1979.

Whirlpool refrigerator, 17.2 cubic ft., 5 yrs. old, gold, freezer top, good cond., \$150. 484-2487.

Maytag washer, gold, 3 cycle, \$160; Kenmore dryer, almond 4 cycle, \$175; loveseat, light earth tones, \$40; weed-eater, heavy duty, 100 ft. extension cord, \$55. 326-1722.

Daybed, \$50; rocking chair, ottoman, \$25; corner book shelf, \$10. Ronnie, x32539.

Sofa sleeper, queen-sized, navy blue w/peach flowers, 2 1/2 yrs. old, \$300 OBO. Cindy, x38801.

Lenox Temperware, 1 set dinnerware, microwave and oven safe, service for 8, Magic Garden pattern, \$30. Jody, 282-4750 or 488-7113.

Sofa, light blue print, \$300 OBO; coffee and end table, glass insert, \$100 OBO; queen-sized bed. Ray, x30823 or 554-5434.

Early American sofa and couch, \$150 and \$50. 482-8827.

Girls 5 pc. French Provincial BR set, canopy bed, double dresser, night stand, desk, chair, \$275 OBO. 282-3267 or 484-1820.

Twin-sized box spring, ex. cond., \$45; Kenmore deluxe microwave, 1.4 cu. ft., 3 stage cooking, programmed defrost, good cond., \$175. 532-1673.

Teakwood sofa, \$135; vinyl top desk, \$15; bookcases, \$30; wood coffee tables, \$45; Kam, 486-5247.

Baby furniture, Bassett crib, Simmons mattress, \$85; Graco baby swing, \$15; baby chair, \$10; yellow lamp, stand, \$35; Mary, 486-5247.

Coppertone gas range, used 1 yr., 26" wide, good cond., \$35 OBO. 644-0315.

25" Quasar console TV, wood grain, remote control, \$350. Doris or Gary, 333-6751 or 332-5372.

Breakfast table, 42" octagon, dark wood, 4 brown leather-strapped chairs, \$150. 482-1429.

Large sleeper-sofa, brown and beige plaid w/wood accents, \$75. Chris, 32606 or 333-3839.

Sturdy oakwood bunk beds, mattresses, ex. cond., \$325. Billie, x38334 or 482-4365.

King-sized bed, oak headboard, Sealy posturepedic mattress, box springs, ex. cond., \$150 OBO. Larry, x38257 or 554-6553.

Wanted

Want roommate to share 3-2 in Friendswood, W/D, cable, microwave, household privileges, non smokers please, \$245/mo., all bills paid. Michael, x38169 or 482-8496.

Want oxygen/acetylene cutting/welding rig w/bottles. Chuck, x34241 or 487-2978.

Want 17' fiberglass canoe. Forest, x35178 or 944-2391.

Want Rockhound books, "Gem Trails of New Mexico," "Gem Trails of Texas," "Gem Trails of Colorado." Jim Bates, x31347 or 944-4687.

Want to buy 2-dr. Buick Regal/Olds Cutlass, must have all records, prefer 50K 70K mi. 499-5786.

Want John Lennon paraphernalia, fanzines, buttons, his two books, will give decent price according to cond., no Beatles, records, tapes. 488-1044.

Musical Instruments

Lowery C-500 electronic organ, \$6,000. D. Long, 337-4051.

Brass Bach Trigger trombone, case, 2.5 yr. old, ex. cond., was \$900, now \$450. Dave, x31146 or 996-0910.

Rogers 5 pc. drum set, high hat, crash, ride cymbals, extra sticks, heads, \$500. 282-3267 or 484-1820.

Photographic

Pentax PC 35AF, 35mm, auto. camera, built-in focus system, built-in flash unit, self timer, auto. winder, 1 1/2 yr. old, \$70 OBO. Cindy, x38801.

Nikon FE-2 w/motor drive and 35mm, 135mm, 43-86mm zoom lens, filters, sun shades, \$650. 334-1126.

Metz 45CT-1 electronic flash, powerful, \$65; Yashica Mat-124G twin reflex camera, \$75. 334-1126.

Pets & Livestock

Gold male kitten, long hair, 8 mos., shots, free. Joan, x34618 or 486-1058.

AKC Dachshund puppies, will be ready the end of March, \$50 deposit will hold. Mike, x39270 or 538-1371.

2 adult cats, neutered male, spayed female, both declawed in front, free to good home. Jerry, x32587 or 799-1549.

Cocker Spaniel, \$10. Jody, 282-4750 or 488-7113.

White cat, 1 yr. old, needs family. Ronnie, x32539.

AKC registered black Cocker Spaniel, willing to stud out; puppies for sale, father, Cocker Spaniel, mother, York a Poo; x33255 or 333-5822.

Lost & Found

Lost small male reddish-brown Pomoranian puppy on Feb. 12 at Fairmont Park in LaPorte, \$100 reward. Connie, 332-4405 or 282-4902.

Miscellaneous

Queen-sized waterbed, light motion, heater, stand-up liner, padded rails, headboard, mirror, shelves, chemicals, BO; Panasonic stereo receiver, turntable, speakers, \$50; Sigma acoustic guitar, \$50. 333-6686 or 480-8772.

Colt Python .357 mag revolver, bright stainless, R/R, W/O, Pachmayr grip, holster, colt soft case, cleaning kit, fired twice, \$650. John, x36484 or 486-1186.

VW rims,