

Space News Roundup

Vol. 25 No. 3

February 28, 1986

National Aeronautics and Space Administration

News Briefs

ERS-1 exchange signed

Data from the first European Remote Sensing Satellite (ERS-1) will be available for U.S. Government research under terms of an agreement between NASA and the European Space Agency. Under the agreement, ESA has agreed to permit direct readout of ERS-1 synthetic aperture radar data at the Fairbanks, Alaska station that NASA is developing as part of the Navy Remote Ocean Sensing Satellite System Scatterometer program. The data is expected to enhance NASA's study of polar ice and will complement other programs, such as TOPEX, the Topography Experiment for Ocean Circulation study, and the third Shuttle Imaging Radar (SIR-C), both planned for operation around the same time as ERS-1. The European satellite is scheduled for launch in 1989.

ASTOVL pact signed

The United States and the United Kingdom have signed a Memorandum of Understanding for cooperation on an advanced short takeoff and vertical landing (ASTOVL) aircraft concept. The aim is to reduce the technological risk associated with potential future ASTOVL combat aircraft. These aircraft would have the capabilities of an advanced supersonic fighter with the added advantage of landing vertically when necessary. The two governments envisage the possibility of undertaking a joint experimental aircraft research program. The U.S. and the U.K. have cooperated for more than 20 years on research and design of the Harrier jump jet, which is produced in the United States as the AV-8B by McDonnell Douglas.

Giotto in good health

Europe's Giotto deep space probe, on its way to a rendezvous with Halley's Comet in March, is reported to be in excellent health by the European Space Agency. There had been concern over the health of the probe when telemetry was lost for 24 hours on Jan. 24 and 25. The European Space Operations Centre, with the help of NASA's Deep Space Network, was able to recover the link. ESA said the problem was due to a ground tracking anomaly which resulted in a mispointing of the spacecraft's antenna. On March 14 and 15, Giotto will make its closest approach to the nucleus of the comet.

Scholarship forms due

Applications for this year's NASA College Scholarship fund are due no later than March 28. Two \$1,500 scholarships for the 1986-87 school year will be awarded in this fourth year of the program. Application forms are available in Bldg. 1, Room 541. Applicants must be dependents of NASA employees. For more information, call Cheryl Howard, x5419.

SPACEHAB signs MOU

Following a Memorandum of Understanding signed with SPACEHAB, Inc. Jan. 14, NASA will negotiate with SPACEHAB for the construction of pressurized modules which would augment the living spaces within Shuttles. The modules would be 10 feet long and 13 feet in diameter and would fit in the payload bay just aft of the cabin. Access would be through the middeck airlock. The modules would provide additional living and working space and could hold up to 100 additional middeck lockers. Habitable volume of the Orbiters would be increased by some 1,000 cubic feet.

Notice to Retirees

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

Moore to assume duties here

Truly named to head Code M

Rear Admiral Richard H. Truly, USN, Commander of the Naval Space Command, has been named to head the Space Shuttle program at NASA Headquarters.

Truly will succeed Jesse W. Moore as the Associate Administrator for Space Flight. Moore, who was named the fourth Director of the Johnson Space Center on Jan. 23, will be assuming his duties here in the next few weeks.

Moore succeeds Gerald D. Griffin, who left JSC Jan. 15 to become President of the Houston Chamber of Commerce.

JSC Deputy Director Robert C. Goetz, named Acting Director upon Griffin's departure, will continue to provide day-to-day management of the Center's activities until Moore moves to Houston.

Truly also will succeed Moore as head of NASA's Design and Data Analysis Task Force which is reviewing the Shuttle *Challenger* accident of Jan. 28.

Truly named as his deputy Thomas L. Moser, Director for Engineering at JSC. Moser assumed his duties as Deputy Associate Administrator for Space Flight Feb. 24.

"Tom is widely respected at all NASA centers," Truly said. "He will be concerned with the day-to-day activities of the Office of Space Flight, as distinguished from the inquiry



Jesse W. Moore

into the accident that destroyed the Space Shuttle *Challenger*."

In his announcement of the appointment, Dr. William R. Graham, Acting Administrator of NASA, said the *Challenger* accident had altered a plan under which Moore would have served as JSC Director and Associate Administrator of Space Flight until after the STS 61-F and 61-G planetary flights in May. As the planetary missions have now been delayed by at least 13 months, Graham said, "the



Richard H. Truly

circumstances of his transition to the Johnson Space Center have changed."

"I am very much looking forward to taking up the challenges that exist at the Johnson Space Center," Moore said. "That center has maintained over the years a very high regard in my mind. It has maintained a tradition of excellence and has an outstanding group of people."

Truly told reporters, "I am very pleased and honored that the Act-

ing Administrator would believe that I have the wherewithal to come back to NASA at this particular and most difficult time. I am delighted to accept the challenge and I have the strongest faith in NASA."

Later in the week, Truly issued a statement addressing the accident investigation.

"I wish to state emphatically that while NASA grieves deeply for the good people lost in the accident, the NASA can-do spirit is intact.

(Continued on page 3)

Galileo, Ulysses, Astro-1 launches postponed

NASA announced last week that it has postponed the Ulysses mission to investigate the poles of the Sun and the Galileo mission to orbit Jupiter and send a probe into that planet. Both spacecraft were scheduled to be launched by the Space Shuttle in May.

The agency also announced that it would not launch the Astro-1 mission, which was scheduled to fly in March. Astro-1 is an ultraviolet astronomy laboratory mounted in the Shuttle's payload bay that was to examine quasars, "hot" stars, galaxy centers and Halley's Comet.

The decisions on Galileo and Ulysses were made by Dr. William R. Graham, NASA acting administrator, after consultations with senior officials of the German Research and Technology Ministry and the European Space Agency. Dr. Graham said that the decision not to launch in May "does not reflect a judgement that the resumption of

Space Shuttle launch operations would necessarily be postponed until after the launch opportunity for either Galileo or Ulysses."

Dr. Graham said the decision took into account two principal factors:

"1. That key personnel required to assure a safe and successful launch of either Galileo or Ulysses are preoccupied with the timely analysis of causes of the 51-L accident.

2. That the consequences of the accident have significantly eroded the schedule margins for launch site processing required prior to the first flight of the Shuttle/Centaur upper stage."

An upper stage is a rocket attached to the spacecraft. It is used to boost a spacecraft on its mission from low Earth orbit after it has been deployed from the Space Shuttle. Two Orbiters were modified to carry the missions, *Atlantis* and

Challenger. *Challenger* was destroyed in the accident Jan. 28.

Although the missions have been postponed, NASA will proceed with planned tests to ensure that all interfaces between the spacecraft, their upper stages, the Shuttle and the launch facilities are validated prior to launch.

Revised launch dates will be determined after a schedule for resumption of Shuttle launches has been established, NASA said.

Due to their trajectory requirements, both the Galileo and Ulysses missions are dependent on the relative positions of Jupiter and the Earth at launch time. (Ulysses also must be sent to Jupiter to get a gravity assisted boost to reach the Sun). Jupiter must be almost directly on the opposite side of the Sun from Earth at the time of launch if it is to be in the required location at the time of spacecraft arrival. This geometric arrangement occurs

once every 13 months. Therefore, for a direct launch to Jupiter, both missions would be delayed at least 13 months until another favorable launch window occurred.

Astro-1 had to be launched in the March-April time frame to observe Halley's Comet. With that opportunity gone, a new, specific launch date request for the mission has not yet been established.

However, scientists are anxious to get the mission into space because of the observatory's capabilities. In addition to the unique ultraviolet observations it can make of celestial objects, Astro-1 could complement the observations of the Hubble Space Telescope. It is capable of wide-field observation would use these observations to select the most interesting targets for detailed investigation by the Space Telescope.

A new launch date will be selected in the future.

MCC and SESL named to Historic Register

The Secretary of the Interior has added twenty-one NASA facilities, including the Mission Control Center and the Space Environment Simulation Laboratory at JSC, to the list of National Historic Landmarks.

The purpose of landmark designation, according to the Department of the Interior, is to identify and recognize nationally significant sites and to encourage their owners to preserve them. Landmarks are chosen after study by the National Park Service.

The landmarks are evaluated by the National Park System Advisory Board and designated by the Secretary of the Interior in accordance

with the Historic Sites Act of 1935 and the National Historic Preservation Act of 1966.

Designation as a National Historic Landmark places a property in the National Register of Historic Places and extends to it the safeguards and benefits provided by the Preservation Act and other Federal laws protecting historic properties.

Other sites named to the Register are located at the Langley Research Center, the Ames Research Center, the Lewis Research Center, the Marshall Space Flight Center, the Goddard Space Flight Center, the Jet Propulsion Laboratory, the National Space Technology Laboratories and Edwards Air Force Base.

At Langley, the facilities named were the Variable Density Wind Tunnel, the Full Scale Tunnel, the Eight-Foot High Speed Tunnel, the Lunar Landing Research Facility and the Rendezvous Docking Simulator.

At Ames, the Unitary Plan Wind Tunnel was named to the list.

At Lewis, the Rocket Engine Test Facility and the Zero-Gravity Research Facility were added to the list. The Spacecraft Propulsion Research Facility at Lewis' Plum Brook Operations Div. was also honored.

At Marshall, the Redstone Test Stand, the Propulsion and Structural Test Facility, the Saturn V Dynamic Test Stand and the Neu-

tral Buoyancy Space Simulator were honored.

At Goddard, the Spacecraft Magnetic Test Facility was named to the list.

At JPL, the Space Flight Operations Facility and the Twenty-Five-Foot Space Simulator were named to the list. Also named was the Pioneer Deep Space station at the Goldstone Deep Space Communications Complex.

At NSTL, the Rocket Propulsion Test Complex was named a historic landmark.

Finally, Rogers Dry Lake at Edwards Air Force base was named as a historic place.

Bulletin Board

STSOC badging transition underway

Employees transitioning to a Space Transportation System Operations Contract (STSOC) company are asked to obtain new badges as soon as possible, according to William A. Larsen, Chief of the Management Services Division. Information on the badging procedures and proper forms may be obtained from the Rockwell Shuttle Operations Co. Security Office at 1120 NASA Road One. Larsen said a special STSOC badging center is also operating in the lobby of Bldg. 30 each Thursday and Friday from 7 a.m. to 4 p.m. until March 31. The badging operation will also be open on weekends and holidays. "STSOC employees may report to this office on the Thursday or Friday before their actual Monday transition date and receive their STSOC badges and turn in their old badges," Larsen said. "Due to the very large number of employees scheduled to transition during the week of Feb. 10, badges also will be issued from 7 a.m. to 4 p.m. on Wednesday, Feb. 5," he said. Larsen said employees do not need to change their vehicle decals.

Mars conference calls for papers

The first call for papers has been issued for a conference concerning the evolution of the climate and atmosphere of Mars. The conference, to be held July 18 and 19 at the Hirshhorn Museum in Washington, D.C., will coincide with the 10th anniversary of the Viking 1 landing on Mars in 1976. The conference is being sponsored by the Lunar and Planetary Institute and the National Air and Space Museum. A series of special programs about Mars, sponsored by the National Academy of Sciences, is planned for the week of July 21. The conference will address three principle topics: Martian seasonal cycles, surface processes and climate history, and bulk chemical composition and outgassing history. For more information, contact Pamela Jones at LPI.

IRS offers tax assistance

As nearly two million Houston area tax filers prepare to file their 1985 tax returns, the Houston IRS office reminds taxpayers that free IRS help is available. Telephone assistance is provided weekdays from 8 a.m. to 4:30 p.m. The local number is 965-0440. The IRS also operates four tax help centers in Houston, located at 3223 Briarpark, 7333 North Freeway, 9809 Rowlett and 515 Rusk.

Credit Union seeks volunteers

The JSC Federal Credit Union Loan Review Committee is seeking volunteers to serve a one year term. Duties would include review of loan applications and activities in support of the Board of Directors. Interested persons should send brief resumes to John Thiel, BD3. Concurrence should be obtained from one's supervisor, Thiel said. The committee meets each Wednesday at noon for approximately 30 minutes.

BAPCO to meet March 18

BAPCO, the Bay Area PC Organization, will hold its next monthly meeting on Tuesday, March 18, at 7 p.m. at the Holiday Inn on NASA Road 1. The local IBM PC user's group is open to all interested persons. BAPCO meets regularly on the third Tuesday of each month. For more information, call Earl Rubenstein, x3501, or Jack Calvin, 326-2983.

New in the Library

The JSC Technical Library is located in Bldg. 45, Room 100, and is open from 8 a.m. to 4:30 p.m. Monday through Friday. The general information number is x4048. New books received in the library as of Jan. 3 include:

AIAA/ASME/ASCE/AHS 26th Structures, Structural Dynamics & Materials Conference, April 15-17, 1985, Proceedings, by AIAA.

AIAA/IEEE 6th Digital Avionics Systems Conference, Proceedings, by AIAA.

Aeronautics and Space Report of the President, 1983, by U.S. G.P.O.

Applications of Artificial Intelligence II, by J. F. Gilmore.

Computational Fluid Mechanics and Heat Transfer, by D. A. Anderson.

Design Dimensioning with Computer Graphics Applications, By J. C. Lange.

Guidance and Control 1980: Proceedings, by L. A. Morine.

Handbook of Electronics Calculations for Engineers and Technicians, By M. Kaufman.

Introduction to Fire Dynamics, By D. Drysdale.

Introduction to Software Physics, by K. W. Kolence.

Materials Sciences in Space, by A. Bewersdorff.

Probability and Random Processes: A First Course with Applications, by A. B. Clarke.

Proposal Preparation, by R. D. Stewart.

R&D Productivity: New Challenges for the U.S. Space Program, by O. W. Baskin.

Rand McNally Road Atlas: U.S., Canada, Mexico, by Rand McNally. (Reference)

Robotics and Artificial Intelligence, by M. Brady.

Rule-Based Expert Systems, by B. C. Buchanan.

17th IEEE Photovoltaic Specialists Conference, 1984: Proceedings, by IEEE.

Space Power, by D. T. Bernatowicz.

Telecommunications and Data Communication System Design with Troubleshooting, by H. B. Killen.

Teacher program continues

Dr. William R. Graham, Acting NASA Administrator, following a meeting with leaders of educational associations and teacher in space finalists, today affirmed the agency's plan to continue the educational programs developed in conjunction with the Teacher in Space Project.

In the announcement Dr. Graham reiterated President Reagan's statement that "... There will be more Shuttle flights and more Shuttle crews and yes, more volunteers, more civilians, more teachers in space. Nothing ends here. Our hopes and our journeys continue."

The original and continuing goals of NASA's Educational Affairs Division, established in 1960, are to increase the prestige of the teaching profession, to increase the awareness in the education community of the impact of technology and science on this country's future and to use space as a catalyst to enhance all subject areas and grade levels of our education systems. These goals have been an inherent part of NASA's educational outreach program since its education office was established in 1960. The Teacher in Space Program represents an amplification of those goals.

NASA's Educational Affairs Division, under the direction of Dr. Robert Brown, has received widespread support for the continuation of the program from teachers, students, the private sector and the general public since the tragedy. Educational organizations and entities such as the Department of Education, National Education Association, American Federation of Teachers, National Science Teachers Association, the Young Astronaut Council, the U.S. Space Camp

and the Public Broadcasting Service also support continuation.

NASA plans include the following:

- Barbara Morgan will assume a leadership role in the Teacher in Space Program from NASA Headquarters when the Shuttle program resumes.
- The eight finalists will continue their efforts to promote the educational goals of the program. Each finalist is working on special projects.
- The 103 Space Ambassadors, finalists in the Teacher in Space Project, have rededicated their commitment to take an active role in their states to motivate young

people to expand their horizons in preparation for the future.

- PBS and public television remain strong advocates of the program and will continue to produce and disseminate educational materials about the space program.
- The Teacher in Space Teacher's Guide, the concept-based activities designed to strengthen critical thinking and problem-solving skills, will be useful in conjunction with all Shuttle missions.
- "Partnerships in Education" initiated with major national education associations will be developed further.

February 1, 1986

To the NASA Family,

All of us in the Teacher in Space Project share your grief over the loss of the *Challenger* crew. Christa McAuliffe was our friend, but she had also become part of the NASA family. Like a family we have shared a common sadness. Now we stand ready to rededicate ourselves to our common goals.

At the memorial service in Houston, more than half of the "Space Ambassadors" from the Teacher in Space project were in attendance. With only a few hours notice, they came from as far away as Alaska to participate in the ceremony. In their names, we thank all of you who helped to make their presence there possible.

With deep gratitude,

Barbara Morgan
Kathleen Beres
Bob Foerster
Judy Garcia
Peggy Lathlaen
Dave Marquart
Mike Metcalf
Dick Methia
Niki Wenger

*Barbara R. Morgan
Kathleen A. Beres
Bob Foerster
Judy Garcia
Peggy Lathlaen
Dave Marquart
Mike Metcalf
Dick Methia
Niki Wenger*

Scientists make first definitive identification of water in comets

A team of NASA and university scientists observing Comet Halley in December 1985 has made the first direct confirmation of water in a comet.

The discovery, the first definite detection of neutral water in any comet, lends new support to astronomers' widely held theory that comets are "dirty snowballs" composed primarily of frozen water. The theory was first developed by astronomer Fred Whipple in 1951, but has only received indirect corroboration to date through discoveries of atoms such as oxygen and hydrogen, molecules such as OH and ions such as H₂O⁺, supposed to be the by-products of underlying ice.

"This is our first direct confirmation that neutral water is the dominant molecular species in a comet," explained Dr. Michael Mumma, head of the Planetary Systems Branch, Goddard Space Flight Center, Greenbelt, Md. The observations were made using a University of Arizona telescope aboard NASA's Kuiper Airborne Observatory, a modified C-141 Starlifter.

The discovery stems from a new theoretical model developed at Goddard by Mumma and Dr. Harold Weaver, now an associate research scientist at the Center for Astrophysical Sciences, Johns Hopkins University, Baltimore, Md. The theory, which Mumma conceived and first presented in March 1980 at a conference on planetary spectroscopy, holds that the parent molecules can best be detected by measuring their infrared fluorescence spectrum stimulated by sunlight.

The theory has been developed extensively since then by the two astrophysicists and has been confirmed by independent work of scientists in France and Japan. It predicts in precise detail the wavelengths and relative intensities of infrared spectral lines emitted by gaseous water and other parent

molecules in comets.

The theory also predicts that a definitive study of cometary water is not possible from conventional ground-based telescopes because of spectral line absorption by water in our own atmosphere.

This problem was minimized by using an airborne telescope and special instrumentation developed at the Lunar and Planetary Laboratory of the University of Arizona by Dr. Harold P. Larson, Dr. D. Scott Davis and Michael Williams. The Arizona group specializes in airborne spectroscopic studies of solar system objects, a program which produced, for example, the detection of water in Jupiter's atmosphere 10 years ago.

The Arizona spectrometer was used to observe Comet Halley on the nights of Dec. 21, 22 and 23, 1985. The flying observatory consists of a 36-inch diameter telescope aboard the C-141 aircraft, operated by NASA's Ames Research Center.

Observations were made at an altitude of 41,000 feet, far above that of any conventional ground-based telescope, to reduce interference by terrestrial water vapor.

Soviet and European spacecraft encountering Comet Halley later this spring also will be looking for water. "Although NASA did not send a spacecraft through Comet Halley, as far as the confirmation of water is concerned, the use of the Kuiper observatory was the most cost-effective way this country could have solved this central problem in cometary science," according to Larson. "This facility and its dedicated staff deserve equal recognition for the success of our project."

The theory accurately predicted the presence of 10 spectral lines of water in Halley's cometary coma, a bright cloud of gas and dust surrounding the cometary nucleus. Observations on Dec. 21 showed four of the 10 predicted lines, while

observations on Dec. 23 revealed all 10. The team saw more lines on the last day because "the brightness of the water lines across the board increased by a factor of three," says Weaver. "Finding such dramatic variability in the comet's behavior was a surprise in itself." Comet variability, he notes, has been observed previously by teams observing their atomic composition and brightness.

Astronomers have been seeking to confirm the presence of water in comets for more than 20 years, first using radio astronomy telescopes and later satellites, such as the International Ultraviolet Explorer (IUE), that observe in the ultraviolet spectrum.

"These attempts largely have failed because water, like most polyatomic molecules, does not fluoresce in the ultraviolet, and the new theory shows that water's radio spectral lines are too weak to be seen," according to Weaver.

The direct detection of a major parent molecule ushers in a new era of direct investigations of the compositions of cometary nuclei and of the physics of cometary coma. Until now, scientists had to work backward, using the known fragments to infer the identities of plausible parent molecules.

This process was highly uncertain because many potential candidates could have produced the observed fragments, but it was impossible to identify any specific precursor. This discovery demonstrates that astronomers now have a powerful new tool for predicting and detecting, with accuracy, parent molecules in comets including gaseous water and other constituents.

The NASA/university team plans to observe Comet Halley again, March 21 through 27 from the Kuiper observatory in Australia, both for water and methane, in an effort to compile the first complete map of a cometary coma for these substances.

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

NASA, DOD, study Aerospace Plane

NASA and the Department of Defense (DOD) have initiated planning for a joint Aerospace Plane research program leading to an entire new family of aerospace vehicles.

Conceptually, a future Aerospace Plane would operate as an airplane at hypersonic velocities (4,000 to 8,000 miles per hour) in the upper atmosphere, or as a space launch vehicle capable of accelerating directly into orbit.

NASA and the DOD have had ongoing hypersonic research for a number of years. The proposed program unifies these separate research efforts. Recent research in the areas of hypersonic propulsion, advanced materials and structures, and computational fluid dynamics has contributed to a consensus that an aerospace plane may someday be possible.

Tests of supersonic combustion phenomena, ramjet theoretical computations, development of high strength, lightweight, high temperature materials and the availability of supercomputers for engine/airframe design integration are among the examples of recent technological advances that support this consensus.

The aerospace plane concept was defined during 1982-1985 in a concept exploration effort by DARPA and NASA with widespread participation by industry and other government research laboratories. The concept centers on a hydrogen-powered aircraft capable of horizontal takeoff and landing and operating at speeds between Mach 12 and Mach 25 at altitudes between 100,000 and 350,000 feet.



This is one example of how the Aerospace Plane might look once in operation. The hypersonic vehicle would be capable of speeds ranging from Mach 12 to Mach 25 and could make forays into low Earth orbit.

The next phase, to begin in 1986, would be the technology development phase and would consist of maturation of key technologies, propulsion module development, and airframe design needed for an experimental flight research vehicle. Engine modules will be built and tested up to approximately Mach 8, the current practical limit of wind tunnels for engine tests.

An experimental aircraft, or X-vehicle, will be designed to explore propulsion performance above Mach 8, while structures and mate-

rials needed to fabricate such a vehicle will be developed and tested. All program participants and others familiar with the program understand and agree that there is a high degree of technical risk.

Participants in the proposed program include NASA, DARPA, Air Force, the Strategic Defense Initiative Office (SDIO) and Navy, with each having approximately equal funding share for the next phase of the program.

The vehicle is of interest because of its capabilities as a global flight

vehicle, a long-range air defense interceptor, and a civil transport. It could be of major importance because of the potential for significantly reducing payload-to-orbit transportation costs. The reduced space launch costs and the dramatically reduced transit times on longhaul airplane routes might have significant economic benefit.

The research aircraft will concentrate on the demonstration of technologies for hypersonic cruise and acceleration into low Earth orbit. This research aircraft will

also be sized to accomplish that research at minimum cost.

The Air Force has been assigned overall program management responsibility for the Aerospace Plane research program and proposes to establish a joint program office at Wright-Patterson Air Force Base, Ohio. NASA is responsible for overall technology direction. In addition to executing the next phase of the program, the program office would explore future applications and plan for vehicle fabrication and the flight demonstration phase of the program.

Truly names Moser Deputy for Space Flight

(Continued from page 1)

We are busy searching for the cause of this accident. After that, we are going to fix it, then get back on the track of exploring and exploiting space."

Moore's career with NASA includes extensive experience in both manned and unmanned spaceflight programs.

Moore worked at the Jet Propulsion Laboratory from 1966 to 1978, where his last assignment was as Science and Mission Design Manager for the Galileo Project. He went to NASA Headquarters in 1978 as Deputy Director of the Solar Terrestrial Division, Office of Space Science, and in June 1979 was appointed Director of the Space Flight Division.

In Dec. 1981, he assumed the position of Director, Earth and Planetary Exploration Division. He was appointed Deputy Associate Administrator for Space Flight in 1983.

Upon the departure of Lt. Gen. James Abrahamson in 1984, Moore became Acting Associate Administrator for Space Flight, and was

appointed Associate Administrator in Aug. 1984.

Moore graduated from the University of South Carolina in 1964 with a master's degree in electrical engineering. He joined General Dynamics Corp. after graduation and worked with guidance systems development for naval missiles.

He is a member of the American Institute of Aeronautics and Astronautics, a senior member of the American Astronautical Society, and a member of Tau Beta Pi and Pi Mu Epsilon.

His NASA awards and honors include the Creative Management Award, the Exceptional Performance Award and the Outstanding Leadership Award. He was honored with the Presidential Rank of Meritorious Executive in 1982.

Moore is married to the former Brenda Kay Polson. They are the parents of two children, Randy and Stephanie. He and his family currently reside in Vienna, VA.

Truly, a former astronaut and Shuttle mission commander, took over the Code M duties Feb. 20.

He was designated a naval aviator

in 1960. His initial tour of duty was in Fighter Squadron 33, where he flew F-8 Crusaders and made more than 300 carrier landings. From 1963 to 1965, he was first a student and later an instructor at the U.S. Air Force Aerospace Research Pilot School at Edwards Air Force Base.

In 1965, he was among the initial military astronauts selected to the USAF Manned Orbiting Laboratory program. He became a NASA astronaut in 1969 and spent 14 years with NASA.

Truly was pilot for one of the two-man crews that flew the Orbiter *Enterprise* during the Approach and Landing Test flights in 1977. He was then assigned as backup pilot for STS-1.

His first space flight was as pilot of the Orbiter *Columbia* on STS-2 in November 1981. He later was commander of STS-8 aboard the Orbiter *Challenger* in the summer of 1983.

Truly became the first commander of the Naval Space Command upon its commissioning on Oct. 1, 1983. The Command is responsible for management and



Thomas L. Moser

operational control of all Navy satellites in use and provides direct space system support to the fleet worldwide.

Truly has received numerous Defense, Navy and NASA awards. He also is the recipient of the Robert H. Goddard Memorial Trophy, the Thomas D. White Space Trophy and the Robert J. Collier Trophy.

He is married to the former Colleen Hanner of Milledgeville, GA. They have three children.

Moser has been an engineer at JSC since 1963. During the Apollo program, he was Structural Subsystem Manager for the Command Module, responsible for the structural integrity, performance, schedule and cost.

He later worked on the Space Shuttle thermal protection system and led activities in the Program for structures and materials during the Shuttle definition and requirements phase.

From 1981 to 1982, he was Technical Assistant to the Director, where he coordinated and implemented the Center's technical management activities. From 1982 to 1983, he was Deputy Manager of the Orbiter Project Office.

Since 1983, he has been the Director of Engineering.

Moser holds a bachelor of science degree in mechanical engineering from the University of Texas and a master of science degree in mechanical engineering from the University of Pennsylvania.

He is married to the former Nelwyn DeLaney of Houston. They have two children.

Lab to evaluate lunar soil as ingredient of concrete

About 1/3 of a cup of lunar soil, returned to Earth on the Apollo 16 mission, will be studied for its utility as an ingredient of construction grade concrete.

Forty grams of lunar soil composite will be transferred to the Construction Technology Labora-

tory in Skokie, Ill. in March. The lab will use the soil to make a 1 in. cube of concrete. The small bit of remaining soil will be used to make a 3 in. by 1/2 in. by 1/4 in. concrete slablet.

The laboratory is a non-profit research facility sponsored by the Portland Cement Association. Re-

sults of the lunar soil tests, which are expected to be available by the fall of this year, will be in the public domain.

Researchers will study the strength of concrete made from lunar soil, as well as the different characteristics of the sample. They will not, as part

of this study, address fabrication techniques which might be employed as part of a possible space construction effort.

NASA planners believe the U.S. will turn its sights back to the Moon after the turn of the century, and have conducted studies such as this one to support a return to the Moon should it be mounted. The idea of a permanent lunar base encompasses many scenarios, such as scientific stations to study deep space in ways not possible from Earth, communications relay facilities and materials processing factories designed to take advantage of the Moon's rich mineral resources.

A lunar facility of this type—or several lunar bases—would require a variety of construction techniques designed for longterm life support in the harsh environment of the

Moon. Planners have devised several options, one of which would involve using lunar rocks and soil as a source for building materials.

The proposal by the Construction Technology Lab to study lunar soil for this purpose was first presented in 1984. The Lunar and Planetary Sample Team, a peer review panel which advises the lunar materials program, reviewed the proposal twice and approved 40 grams for study in the fall of 1985.

The 40-gram lunar soil sample is considered to be a normal allocation for research purposes, according to Dr. Douglas Blanchard, Curator of the Nation's lunar sample repository at the Johnson Space Center. Apollo astronauts returned a total of 843 pounds of lunar rocks and soil during the Moon exploration program.

Telephone system survey begins

JSC employees will be taking part in a survey soon, as work proceeds toward installation of the Center's system.

Scheduled for installation late this year, the system will provide more than 10,000 voice/data ports and will replace JSC's antiquated phone system, which dates back 23 years to the earliest days of the Center.

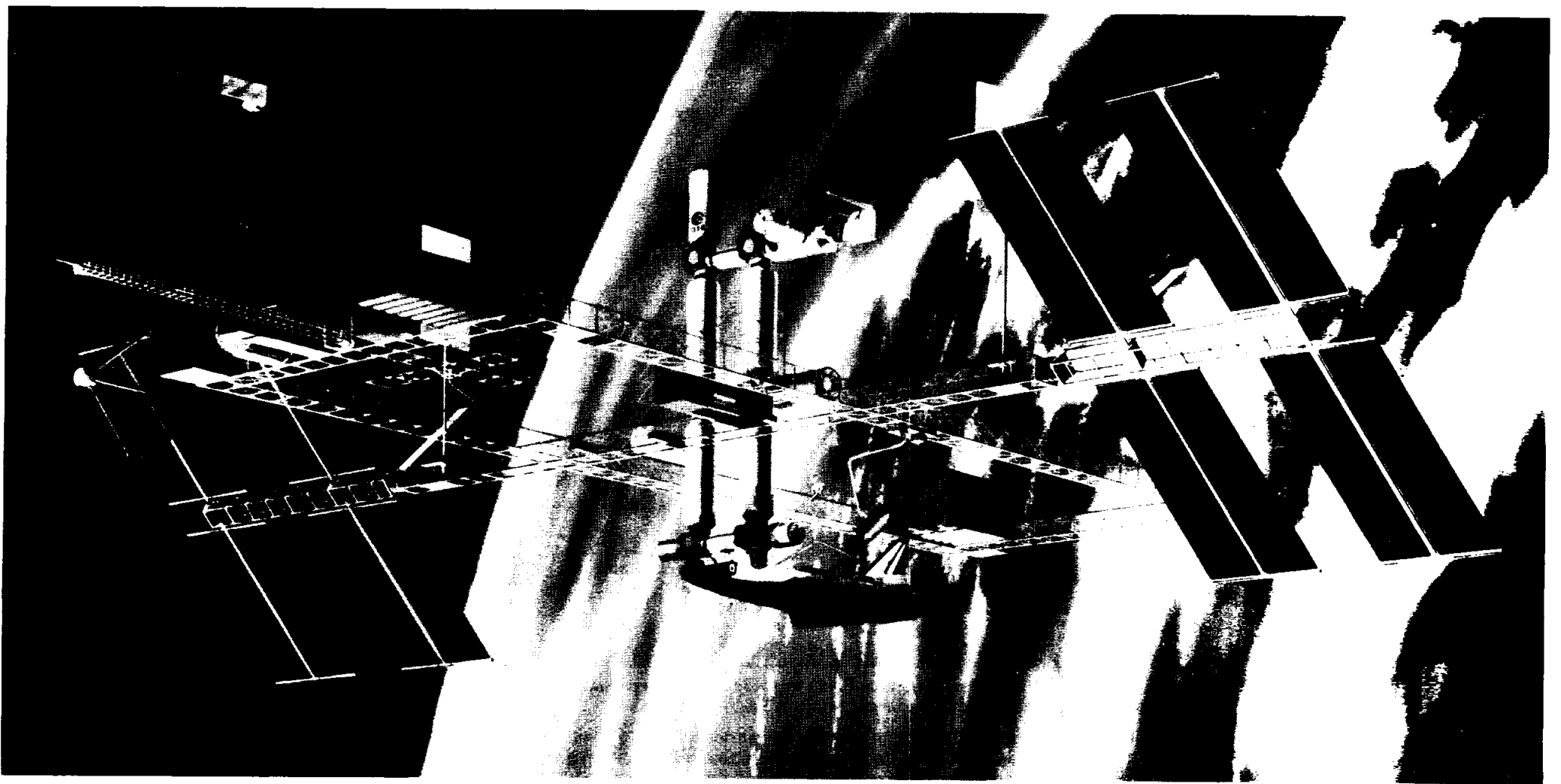
The survey will allow employees

to list their telecommunications needs, and will allow ROLM Corp. to configure the new system. ROLM was chosen in September 1985 as the vendor of the system under a \$14.9 million contract.

Individuals from within the various JSC organizations have been chosen to help with the transition. Known as user coordinators, they will be passing the survey forms to

their fellow employees in the next few weeks. The user coordinators will also be responsible for overseeing the telecommunications needs of each organization, and will be key contacts for questions or help as the transition proceeds.

Over the next few months, articles in the *Space News Roundup* will describe the features and uses of the new phone system.



This artist's concept of the latest Space Station design is the most detailed yet available for the dual keel configuration. The dual keel design offers a better microgravity environment for Station users. The concept also shows in use the longer habitable modules now being favored by Station designers. Many of the basic Station designs will be finalized in the next several months.

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 & Rental

Sale: Friendswood 3-1.5-1, near schools, fenced, FPL, cathedral ceiling, assume 9.5% VA, \$12K equity, \$49,000. 482-7546.

Sale: Hobby/Gulfgate area 4-2-1, garage opener, large paneled den, fan, high effic. central air/heat, drapes, detached workshop, fenced, appraised at \$52,200, make offer. Leona, x3338 or 643-4456.

Sale/lease: 2-2.5 custom townhouse, garage, appliances, FPL, jacuzzi, Mike, 280-4211 or 554-6378.

Lease: Kemah 1 BR pole house, on the water, quiet, no pets/children, \$395/mo. 326-5244.

Sale/lease: One BR condo, mini-blinds, FPL, W/D, refrig., drapes, patio, covered parking, near NASA. 326-2282.

Sale: Brookforest 4-2.5-2, spacious rooms, covered patio, immaculate, near pool and tennis, \$134,900. Jim Kisio, x4794 or 486-4323.

Sale: 421 acres near Center, TX, on Hwy. 7, 300 acres of timberland, 1/2 minerals. Billie, 482-4365.

Lease: University Green 3-2.5-1 townhouse, W/D, refrig., microwave, unfurnished, \$700/mo. David, x3721.

Rent: 2-1 garage apartment on lake, fully furnished, cooking equipment, separate entrance, off-street parking, pool, \$280/mo. bills paid. 532-1643.

Rent: Mobile home, 3-2-2, FPL, wet bar, patio, fenced yard, all appliances. Eve, 559-2925.

Lease: El Dorado Way 1 BR condo, W/D, FPL, covered parking, pool, tennis, fitness room. 488-8026.

Sale: Horseshoe Lake Estates 3-1 house, Romayor, TX, AC, furnished, 1 acre, on small lake, near Trinity River, \$15,000 OBO. Peterson, x3138 or 479-5594.

Sale/lease: Baywind 2 BR condo, \$350/mo. plus deposit, appliances, W/D connections, storage, pool, children O.K., no pets. Cecil, x3133 or 488-0719.

Cars & Trucks

'84 LTD Crown Victoria, loaded, clean, \$4,800. Wright, x2211 or 471-5964.

'69 Mercedes 280SL, AT, AM/FM/cassette, 2 tops, rebuilt engine, \$10,000. 554-5002.

'85 F150 Explorer pickup, 1/2 ton, auto O/D, dual tanks, cruise, AM/FM, AC, \$11,000. Kirk, 554-5816.

'77 Chevy Impala 4 dr. sedan, AC, PS, PB, \$950. 326-3227.

'78 Honda Accord LX hatchback, AC, PS, AM/FM/cassette, sharp in and out, 1 owner, reliable, \$3,200. Steve, 554-6907.

'82 Chevy G-20 cargo van, 6 cyl., auto, AC, PS, PB, aux. fuel, gauges, AM/FM/cassette, hi-back seats, carpeted, security glass, 33K mi., \$7,000. Bob, 482-5984.

'78 Chevy pickup, 350 V-8, auto, AC, PS, AM/FM/cassette, clean, \$2,400. 480-4035.

'79 Camaro, AC, AM/FM, good condition, \$2,250. Al, x3803 or 421-2830.

'71 Pinto, new brakes, fuel pump, shocks and battery, current inspection and license, runs well, \$345 firm. Edwards, X3655.

'78 Toyota Celica, 5-spd., AC, PS, AM/FM/cassette, service manual, new rear tires, engine in great shape, \$2,000. 538-2474.

'79 Ford custom van, ex. cond., 2 air, 2 gas tanks, 50K mi. Perez, x2831 or 485-2165.

'75 AMC Hornet, good condition, no rust, AM/FM, AC not working, work car, \$550. Jack Day, x4731 or 664-9472.

'82 Camaro V-6, std., AC, AM/FM, new clutch/tires, velour interior, ex. cond., 49.5K mi., must sell, \$5,150. 332-4871.

'73 Thunderbird, leather seats, AC, new tires/battery, complete overhaul of motor & trans., like new, \$850. Joe Mayfield, X3240 or x3249.

'84 Camaro Berlinetta, V-8, AC, PB, PS, tilt, cruise, PW, AM/FM/cassette, T-tops, \$9,875. Ben, x4971 or 488-1326.

Cycles

'80 Kawasaki 440, ex. cond., 5K mi., must sell, \$700. Henry, x4647 or 486-1957.

Vespa 50cc engine, wheels, tires, front end, manual, plus... \$50. Samouce, x2939.

'75 Yamaha BD-250, \$250. Jon, x3833.

'83 Honda 650 Silverwing, new condition, 3,600 mi., accessories. Moser, 474-2060.

Boats & Planes

18 ft. catamaran, AMF Trac, trailer and extras, like new, \$4,550. 333-3056.

Audiovisual & Computers

Pioneer SX-780 stereo receiver, 45 watts/ch., perfect condition, \$90. 326-3370.

Barron's computer study program for the SAT, runs on Commodore 64, 3 disks, 2 workbooks, SAT study text, manual, \$30. Samouce, x2939.

Household

Antique oak dining table, matching chairs, \$400; working barometer ca. 1865, \$350; 6 matching dining chairs w/matching chaise lounge, ca. 1850, \$1,000. 554-5002.

Penney's gas range, electric start, continuous clean, almond, \$200. 486-7315.

Loveseat hide-a-bed, plaid Herculan fabric, \$50. Brian, x5111 or 480-5194.

ACME Juicerator, separates juice from pulp, cost \$200, asking \$50 OBO. Leona, x3338 or 643-4456.

Dressmaker sewing machine in cabinet, basic stitches plus buttonholes, zippers, blind stitch and hemmer, ex. cond., \$100. Robin, x5024.

Student desk & chair, \$35; antique trunk, \$75; Mitsubishi 19" color TV, needs work, \$50; girl's bike, good condition, \$30. 944-6457.

Girl's size 10 fur coat, like new, \$50; lavender twin comforter, sham, dust ruffle and curtains, custom made, \$75. 944-6457.

Oriental rug, 9' x 12', wool blend traditional horesman pattern, very nice, \$125; belt massager, very good for sore muscles, \$50. 482-8262.

Kenmore washer/dryer, heavy duty, white, \$325. Chapman, 488-9005, x272, or 480-8054.

Single bed frame, box spring, mattress, will deliver locally, \$75. Lonnie, x2651.

Pets

Registered AQHA mare, rides English and western, gentle and sound, excellent with children and adults. 474-3424.

Wanted

Want to buy electric trains. Don Jeffers, x2449.

Want female basset hound puppy. Terri, x6445 or 482-5354.

Want potter's wheel, Brent preferred, any considered. Lee, x2697 or 554-6738.

Want house to rent in July, for visiting research professor, family of three, no pets. Richard Juday, x5391.

Want canning jars. 554-2063.

Want roommate for 2 BR condo on Clear Lake with boat slip, \$250/mo. all bills paid, non-smoker. Charles, 326-4855.

Want to trade carrier carseat for high top carseat, or will buy. Becky, x3580 or 944-2371.

Miscellaneous

Exercise trampoline, \$25. Al, x3803 or 421-2830.

Free: old lawn mower, still runs. I deliver for \$10. 538-2474.

Utility trailer, 5' x 7', with lights and registration, \$75. Chapman, 488-9005, x272 or 480-8054.

Beer tapper bar with keg and pressure bottle. Lee, x2697 or 554-6738.

Craftsman sanding and grinding attachment for drills, 6 extra sanding belts, like new, \$20; Hirsh miter maker attachment for circular saws, never used, \$20. Frank, x3249 or x3240.

Baby bassinett, used 4 mos., \$25; baby picnic carryall basket, \$10. Becky, x3580 or 944-2371.

Fully self-contained motor home for rent, sleeps 6 to 7, \$325/wk., \$50/day, 10 cents/mi. 996-0734.

Cookin' in the Cafeteria

Week of March 3 — 7, 1986

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 March 10 — 14, 1986

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

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

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

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

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

Week of March 17 — 21, 1986

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

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

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

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

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

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.