

Space News Roundup

Fletcher says Moon, not Mars, may be better first step

NASA Administrator James C. Fletcher says the Moon, rather than Mars, may be the best initial destination for possible United States/Soviet Union manned missions.

"Going to the Moon together would give the two leading space-faring nations in the world an opportunity to build a stable base for further cooperation, which could, one day, lead to a cooperative mission to Mars," Fletcher told participants at the National Space Symposium in Colorado Springs.

Fletcher stressed that any cooperative manned activity should be preceded by a program of cooperative unmanned activities.

"Flying out to Mars together before building such a foundation could, for several reasons, be less practical," Fletcher said in his April 14 address. In the last several months, a number of parties have advocated a U.S./USSR manned mission to Mars. Fletcher cited three crucial factors favoring the Moon for an initial cooperative

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manned mission:

★ **Timing** — A joint mission to the Moon would involve a relatively short timetable, while a Mars mission "would probably encompass four or five presidential administrations," Fletcher said. He said relations between the U.S. and the USSR have yet to demonstrate that degree of stability.

★ **Cooperative experience** — A

year ago, the U.S. and the USSR signed a space science agreement that established joint working groups in five areas. The efforts of these groups "could lay the groundwork for a strong bridge of mutual cooperation and mutual trust," he said.

★ **Technical readiness** — Both realize there are "many technical unknowns involved in a manned Mars mission," Fletcher said. Issues such as the effects of prolonged weightlessness on humans

must be considered before Mars mission pacts can be made.

In a more general vein, Fletcher labeled 1988 "perhaps the most critical year in the history of the U.S. civil space program," and he criticized those who say American leadership is a thing of the past.

"It's ironic that these doom-and-gloom-sayers have emerged this year, just when the United States is poised to launch itself into a new era of development and exploration of space," he said.

Solid rocket motor firing tests O-rings

The full-duration firing of Qualification Motor-6 (QM-6) on Wednesday appears to have been a success, according to initial test results.

The third in a series of five tests of the redesigned Space Shuttle solid rocket motor at Morton Thiokol's Wasatch Facility near Brigham City, Utah, went off without a hitch at noon CDT. The firing lasted two minutes.

The test included two intentional flaws. A "wave defect" was inserted in the surface of the center field joint's bonded insulation J-seal to test the capture feature O-ring, and a small blowhole was created in the polysulfide adhesive of the redesigned case-to-nozzle joint to test the new wiper O-ring.

Test officials said they would continue to analyze the test results, and prepare for the two tests remaining before STS-26, QM-7 and Production Verification Motor-1.

In a related development, NASA announced plans April 18 to issue a request for proposals in June or July for an Advanced Solid Rocket Motor (ASRM) that would make the Space Shuttle capable of lifting 12,000 more payload pounds and eliminate the need to throttle the main engines during ascent.

Design, construction and operation of a government-owned test and production facility are part of the request for proposals (RFP). A Site Evaluation Board has been formed to recommend a tentative government site for inclusion in the RFP as a common basis.

The ASRM acquisition plan submitted to Congress contains NASA's strategy for a full and open competition to introduce an ASRM into the Shuttle system. This is expected to substantially improve flight safety design margins, reliability and performance.

The RFP—for ASRM design, development, test and evaluation (DDT&E)—is being scheduled to achieve an earliest launch opportunity in fiscal 1994. The RFP release is compatible with the stipulations of the NASA Authorization Act of 1988 and the requirements for initiation of the necessary redesigned solid rocket motor follow-on procurements.

NASA plans to proceed with a segmented motor design that incorporates substantive design changes to improve the reliability and the design safety margins. In addition, the ASRM ballistic design precludes the necessity for throttling the Space Shuttle main engines during the period of maximum dynamic pressure, which reduces or eliminates about 175 criticality 1/1R failure modes for the Shuttle system.

The ASRM's design goal to provide a 12,000 pound payload increase will equate to an additional 2.4 equivalent Shuttle missions per year (at a rate of 14 missions a year) and will support Space Station deployment and other critical missions.

To achieve the level of process control and automation needed for high quality and reproducibility,

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JSC Photo by Jack Jacob

Interested faces watch as one of several motivational speakers addresses a large crowd of Manned Flight Awareness honorees and dignitaries in JSC's Bldg. 2 auditorium April 13.

Locals accept awareness honors

The first Manned Flight Awareness Honoree Program ever held at JSC honored 215 people NASA-wide this month, including six from local contractor operations.

Honorees came from all of the NASA centers, Vandenberg Air Force Base and the U.S. Air Force Space Division, and from as far a way as Guam.

They received certificates and an all-expense paid trip to Houston, where they toured the city and the center, and attended a program and reception with top NASA management, astronauts and other dignitaries.

"We tried to provide an awareness of the full extent of what is taking place at JSC," said Hank Williams, who represents JSC on the Manned Flight Awareness national panel.

Houston Mayor Kathy Whitmire, Houston Chamber of Commerce President Gerry Griffin and JSC Director Aaron Cohen met with the honorees at a get-acquainted social at the Houston Museum of Natural Science on April 12.

Motivational talks, featuring NASA Associate Administrator Dale Myers, and Rear Adm. Richard

Truly, associate administrator for space flight, Arnold Aldrich, director of the National Space Transportation System, and JSC Director Aaron Cohen were made April 13 in JSC's Bldg. 2 auditorium. Twenty-eight astronauts attended a reception at Brady's Landing following the presentation.

Local honorees were John F. Gladu and Edward F. Lednicky of Boeing Aerospace Operations; Glenn Norman and Gary Smith of IBM Corp., and Cullen Wright and Lee Olson of Lockheed Engineering and Management Services Co.

Lois Walker, who assisted Williams in coordinating the program at JSC, said it honors individual government and contractor employees who have exhibited outstanding performance and is one of the most coveted awards for work on the government/industry space team.

Manned Flight Awareness programs in the past have been held at Kennedy Space Center in association with launches. During the standdown, the programs are being rotated among NASA centers.



NASA illustration by Pat Rawlings

The ultimate opportunity to have your name up in lights—well, at least one you've chosen—has arrived. NASA and contractor employees have been invited to help name the Space Station. For details, see Page 2.

Budget crunch to delay Station

Man-tended capability achievable by 1995

Budget constraints will postpone launch of the first Space Station element by a year, according to NASA Administrator James C. Fletcher, but man-tended capability can be achieved by late 1995.

Fletcher reported the findings of a "Space Station Program Response to the Fiscal Year 1988-1989 Revised Budgets" on April 12 in letters to leaders of congressional appropriations committees that had mandated the rescoping and rescheduling plan.

"The only sensible way to accommodate the Space Station funding profile inherent in the FY 1988 and 1989 budget reductions is to slip the major program mile-

stones," Fletcher wrote.

"I believe that the current Station configuration is the correct one, and that descopeing the design would be extremely unwise.... It represents, in my view, the optimal balance between development costs, operations costs and satisfaction of user requirements in a safe Station."

Fletcher said that to achieve earliest possible man-tended capability, the baseline assembly sequence will be changed to provide launch of the pressurized laboratory module on the fourth assembly flight of the Space Shuttle in the last three months of 1995. Such a capability can be provided

with minimal cost impacts, and will not delay the permanently manned capability.

The laboratory will be launched with the useful capability but will not be fully outfitted until the sixth assembly flight, he said. User outfitting could be quadrupled if the Advanced Solid Rocket Motors were available for lab module launch, he added.

Before the laboratory can be accommodated, he said, the Station truss structure and basic power, propulsion, guidance and control, and Shuttle docking systems must be placed in orbit on the first three assembly flights.

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Space News Briefs

Ames develops perspective display system

A computer-generated display system, to aid close-in spacecraft maneuvers, has been developed at NASA's Ames Research Center. The display can precisely depict a spacecraft's position relative to other vehicles and objects, allowing rapid, accurate monitoring and response. Developed by Stephen R. Ellis and his colleagues, the system can be placed aboard spacecraft such as the planned U.S. Space Station. It would help in conducting and monitoring maneuvers within one mile of the Station.

Bulletin Board

U.S. Savings Bond Campaign is April 25-May 6

JSC kicks off its 1988 U.S. Savings Bond Campaign on April 25. The campaign, designed to encourage employees to join the Payroll Savings Plan and invest in five-year bonds earning market-based interest, runs through May 6. Canvassers may call on you during the campaign and ask you to sign up or increase the amount you set aside from each paycheck. For more information, call x38970.

Secretarial video teleconference is April 27

The Human Resources Development Branch and the Equal Opportunity Programs Office will participate in the "First Annual Secretaries Briefing" video teleconference from 1:30 to 4 p.m. April 27 in the Bldg. 2 auditorium. The program, sponsored by the American Management Association and Professional Secretaries International, is open to all JSC and contractor employees. For more information, call Joann Walgamuth, x33077.

Commodore users to meet April 28

NASACOMM, a Commodore users group, will conduct its next meeting at 7:30 p.m. April 28 at the Harris County Park Bldg., 5001 NASA Road 1. For more information, call Bill Moore at 335-6251 or x53462.

Semiconductor lasers topic of May 4 video conference

"Semiconductor Lasers and Light Emitting Diodes for Telecommunications," an IEEE Education Committee-sponsored video conference, will be downlinked to the Gilruth Recreation Center at 11 a.m. May 4. It will cover laser operations, technology, characteristics, telecom applications and future trends. For more information, call Nancy Marshall, x30174.

Galveston historical homes tours begin May 7

Tickets are on sale for the 14th annual Historic Homes Tours on Galveston Island, sponsored by the Employee Activities Association. Tours will be conducted May 7, 8, 14 and 15, from 10 a.m. to 6 p.m. Saturdays and noon to 6 p.m. Sundays. Admission costs \$9, and covers tours of seven private homes and admission to two informative talks. For more information, call x35350.

'Back to the Future' JSC picnic set for May 7

A "Back to the Future" JSC picnic is planned from 11 a.m. to 5 p.m. May 7 at the Gilruth Center. Barbecue dinner will be served between noon and 3 p.m. Tickets may be purchased through May 4 at the JSC Exchange Store located in Bldg. 11.

Skylab 15th anniversary conference May 11

"Skylab Revisit," a conference recognizing Skylab's 15th anniversary, is planned for May 11 at the Von Braun Civic Center in Huntsville, Ala. An evening reception is planned at the Alabama Space and Rocket Center. Cost is \$65, and includes lunch, evening reception and all panel sessions. A \$25 fee is available to retirees and full-time students to attend only panel sessions. For more information call Karen Mack, 205-895-6372.

Symphony presents 'Romantic Evening' May 14

The Bay Area Symphony League of the Houston Symphony Orchestra will present a "Romantic Evening" featuring music from variations of Romeo and Juliet at 8 p.m. May 14 at the University of Houston-Clear Lake Atrium. Guest conductor will be Niklaus Wyss. For ticket information, call 488-1284.

Olympic and world ice skating exhibition is May 19

The next JSC-EAA night at the Summit will feature a "Tour of Olympic and World Skating Champions" at 7:30 p.m. April 18. Medalists from the 1988 Winter Olympic Games, including Debi Thomas, will perform. A limited number of tickets are on sale at the Bldg. 11 Exchange Store for \$18 each. For more information, call x35350.

NACA Reunion IV coming up in September

Planning is complete for NACA Reunion IV, a reunion of former employees of the National Advisory Committee for Aeronautics. The reunion will be Sept. 30-Oct. 2, 1988, at the Red Lion Inn, San Jose, Calif. Activities will include a Friday night Western buffet, a Saturday night banquet and a farewell champagne brunch on Sunday. All former employees and military detailees and their spouses are invited. For more information, call John Dusterberry, 415-493-6846, or write the reunion committee at P.O. Box 6-1988, Mountain View, Calif., 94042.

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. April 26 or May 3.

Defensive driving—Course is offered May 21 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 on May 4 or 19. The cost is \$4.

Softball tournament—Men's Open C & Mixed softball tournament will be May 14 and 15. Entry fee is \$95; entry deadline is May 11.

Physical fitness—Next session will be July 5-Sept. 23. Classes meet at 6:30 a.m. Mondays, Wednesdays and Fridays.

5K Fun Run—AIAA-sponsored run will begin at 8 a.m. May 14 at the Rec Center. Prizes for first, second and third place in each men's and women's age category. Entry fee is \$8 before May 3 or \$10 race day. For more information, call Scott Satterwhite, 282-7756.

Almost Anything Goes—Six coed teams are needed Saturday, May 7 at the JSC employees picnic. Teams consist of three men and three women. Entry fee is \$10; entry deadline is April 29. Every team member will receive a T-shirt.

JSC hiring freeze eases slightly

The ice on civil service hiring at JSC is thawing, but the freeze remains officially in effect.

Human Resources Director Jack Lister said JSC was granted limited relief this month to begin refilling high priority positions. However, the center will be allowed to hire only in its most critical areas, and must phase its

hiring so as not exceed a reduced full-time equivalent (FTE) ceiling of 3,403 civil servants, he said.

"I'm pleased that we have the opportunity to meet our most critical needs right now," Lister said.

"We also have permission within these guidelines to hire our graduate coops in May and June and

I'm pleased about that," he said.

Lister said 38 graduating coops already working at JSC will be hired permanently during those two months.

The hiring freeze was instituted Nov. 23, 1987, due to a sequestration of fiscal year 1988 funds under the Gramm-Rudman-Hollings deficit reduction act.

Seniors to see JSC managers in action

Managers at JSC have volunteered to host 24 seniors and four teachers from local high schools for a "Management Experience Day" on April 27.

Each student and teacher will be assigned to accompany a manager or supervisor through his or her afternoon activities. The observers will be matched with managers working in their fields of interest, and will be authorized to be present during every business task.

The experience is being sponsored by the JSC Chapter of the National Management Association,

which hopes to make the pilot program an annual event.

"We hope that by bringing seniors into the program we can provide some exposure to what constitutes management within a government agency, and possibly influence their choice of future education and training," said Daniel A. Nebrig, executive assistant to JSC Director Aaron Cohen.

The students, from Clear Lake, Clear Creek, Pearland and Friendswood High Schools, were recommended by educators at their schools. They were chosen for their

interpersonal and leadership skills, interest in learning about NASA leadership, and intent to attend college. Faculty members were chosen from each school for their leadership skills, interest in practical application of management theory and ability to share the experience with other faculty and students.

The experience day will begin at 8:30 a.m. with a welcome briefing and tour of JSC. After lunch, observers and managers will be paired from 1 to 4 p.m. A debriefing will be conducted at 4 p.m.



WALLS GO UP—Workers are putting up the exterior walls of Bldg. 9B this month. The building addition is 75 percent complete, said Mary O'Hearn, construction manager, and it is hoped that it can be occupied by Aug. 1.

Budget crunch limits contractor hiring

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payloads until the sixth and seventh assembly flights.

The full report notes that NASA has directed its four Work Package contractors (Boeing Aerospace, McDonnell Douglas, General Electric and Rocketdyne)—now operating under letter contracts—to constrain hiring of personnel and subcontracting efforts so that

they may retain key personnel and add only the staff necessary to accomplish a Program Requirements Review.

Similar constraints have been placed on hiring to support programwide engineering and integration analyses through the Program Support Contract with Grumman Aerospace and the Technical and Management Information System and Software Support Environment

contracts with Boeing Computer Services and Lockheed Missiles and Space Co., the report states.

"This program represents a critical element in the Nation's efforts to reinvigorate leadership in manned civil space endeavors," Fletcher wrote. "The realization of the full scientific, technological and commercial potential of space requires the attention of men and women living and working in orbit."

Employees may suggest Space Station names

The ultimate opportunity to have your name up in lights — well, at least one you've chosen — has arrived. NASA and contractor employees have been invited to help name the Space Station.

Suggestions must reach Mark Hess, public affairs officer, at Headquarters by the close of business, May 9. A JSC announcement with detailed instructions of how and where to send suggestions is being distributed.

"As the Space Station program prepares to enter its development phase, I believe it is an appropriate time to begin the process for selecting a name," James B. Odom, NASA Associate Administrator for Space Station, wrote in a recent letter.

Odom has assembled a Space Station Name Committee chaired

by Dr. Franklin Martin, Deputy Associate Administrator for Space Station, which will make its selection in accordance with the NASA Management Instruction (7620.1C) on "Official Names for Major NASA Projects."

The international partners also will be involved in the process. The resulting assessment and recommendations will be presented to the NASA Administrator James C. Fletcher, who will make the final selection.

The committee has established criteria that must be satisfied by any suggestion: names must be simple and easily pronounced; names must not duplicate or be so similar to other NASA or non-NASA names that they create confusion; acronyms are to be avoided; names must be translat-

able and must not have ambiguous or offensive meanings in the languages of NASA's international partners; names of living people will not be accepted; and rationale for names must accompany suggestions.

Although NASA does not plan to publicize the process or solicit suggestions from the general public, voluntary suggestions from the public will be accepted, provided they meet the above criteria.

A suggestion form, and a list of already suggested names to which the committee is requesting reactions, will accompany the JSC announcement.

Comments and suggestions should be sent to Mark Hess, Public Affairs Officer (Code S), NASA Headquarters, Washington, DC 20546.

Advanced solid rocket motor request out

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NASA has concluded that a substantially new facility is required.

In keeping with the President's new space policy encouraging commercial initiatives in space, companies responding to the RFP will be required to propose a private-financing option for the new ASRM facility on a tentative

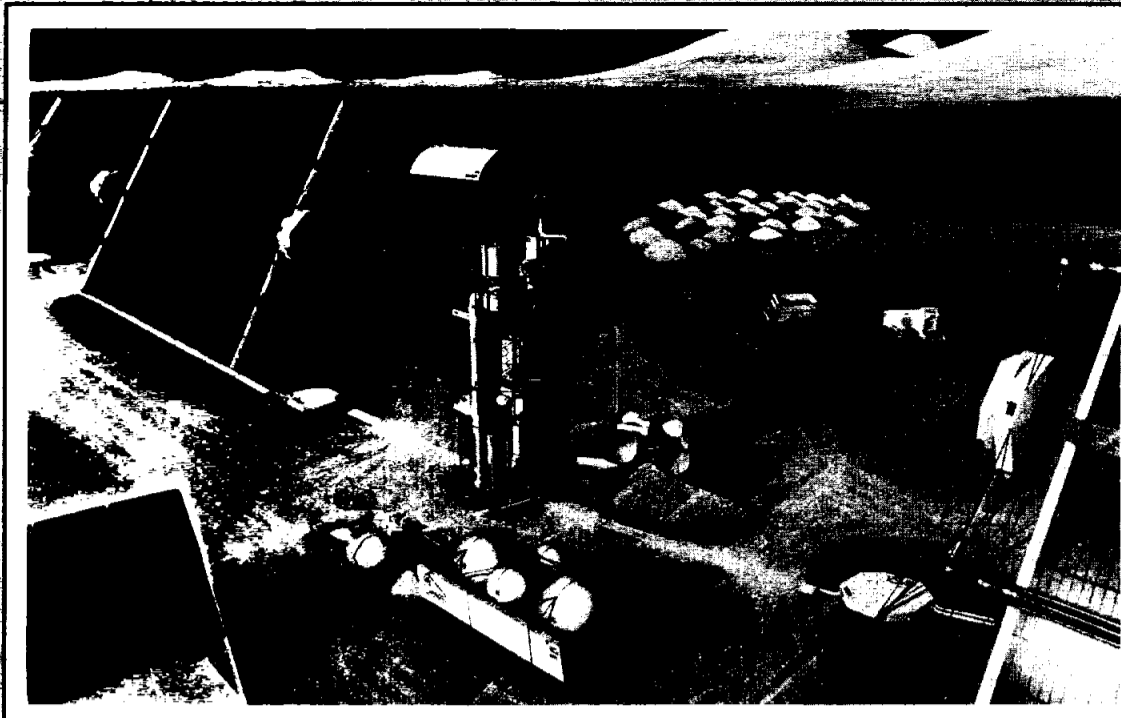
government site. NASA also will solicit optional proposals for a privately owned facility.

All approaches must be structured to allow timely and economical recompetition of the SRM contract by the government.

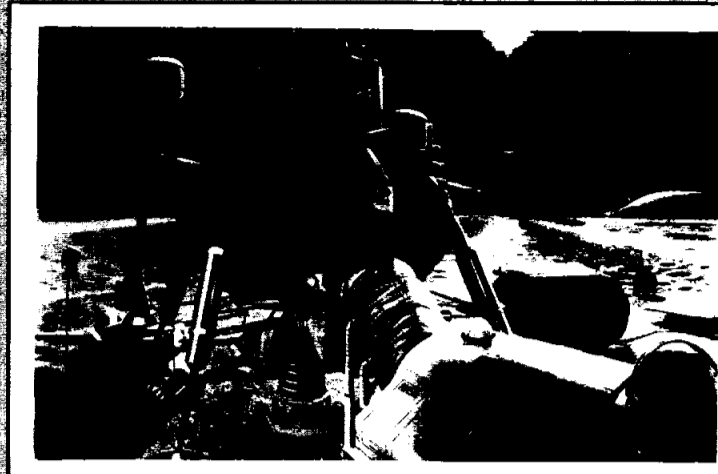
The overall ASRM DDT&E cost is estimated at just under \$1 billion, including modern tooling and

equipment, plus \$200-300 million for construction of facilities.

The planned ASRM development is critical to NASA and will provide substantive improvements in flight safety design margins and reliability, achieve full Shuttle payload capability, optimize program cost, encourage commercial initiatives and promote industry competition.



Oxygen propellant derived from lunar raw materials could help reduce the amount of mass launched into low Earth orbit to support a lunar base, and thus cut costs. At left is a pilot plant producing liquid oxygen from ilmenite. Below, crew members shut down a Lunar lander's flight systems for layover. The pressurized vehicle in the foreground is waiting to take the crew to the lunar base, while other equipment supports the lander.



MOON BASE: Lunar base symposium was 'a parade waiting to happen'

By Kelly Humphries

"We've come a long way, baby," said Wendell Mendell, long-time champion of a lunar base, as he looked at the new NASA Headquarters telephone book.

The new phone book, featuring a Moon base concept cover illustration, arrived about the same time as a statement by NASA Administrator James C. Fletcher supporting the Moon, rather than Mars, as the best initial destination for possible U.S./USSR manned missions.

"The statement is highly consistent with the stand I and my colleagues have been taking over the last five years," said Mendell, a JSC planetary scientist who has been talking lunar base since Apollo. "I think it's right on target. I think the President's space policy is an excellent basis on which to build a strong civil space program, and that Sally Ride's report plus Dr. Fletcher's statement start to set down specifics of what needs to be done."

The Fletcher statement also came on the heels of a successful second symposium on Lunar Bases and Space Activities of the 21st Century. Three things about the symposium stand out, according to organizers Mendell and Barney Roberts.

First, the number of people who attended the April 5-7 event at the Westin Galleria Hotel in Houston was unexpected, as were the amount of interest and enthusiasm they displayed.

"To our surprise between 550 and 600 people showed up," said Roberts, manager of JSC's Exploration Studies Office, who served as the symposium's administrative chairman.

"It was right at the limits of our most optimistic projections," said Mendell, technical program chairman. "We ran out of supplies because we hadn't anticipated that level of response. I had a lot of comments on the general level

of energy and enthusiasm. People were just amazed that so much was going on. They had anticipated a much smaller gathering."

Second, the make-up of the participants was different from that of the first symposium.

"When we held the first meeting in 1984, out of 100 papers presented there were probably fewer than five that represented funded work," Mendell said. "This meeting had a substantial NASA component. There were people from all the NASA centers here giving papers on work that they were doing that's related to future initiatives efforts."

Speakers included NASA Deputy Administrator Dale Myers; JSC Director Aaron Cohen; Mark Craig, manager of the Lunar and Mars Exploration Office at JSC; Gerry Griffin, president of the Houston Chamber of Commerce and former JSC director; Harrison Schmitt, Apollo 17 astronaut; former NASA deputy administrator Dr. Hans Mark; and Dr. H.H. Koelle, chairman of the International Academy of Aeronautics committee on international lunar base concepts.

This was also the first large meeting where the new Office of Exploration, its structure and plans were featured, he added. John Aaron, NASA assistant administrator for the Office of Exploration, spent all three days at the conference.

"The Office of Exploration is actually now funding studies and getting organized," Mendell said. "The management at the various NASA centers has a sense that something might be happening and they want to send people to learn more about it and are more willing to send people to give papers."

In addition, people from outside the aerospace community and the country attended and contributed. The Ameri-

can Society of Civil Engineers and the American Geophysical Union co-sponsored the symposium.

"You really got a sense that this was a parade waiting to happen," said Alan Ladwig, director of program support and special projects for the Office of Exploration.

The question now, he said, is "how do we now make sure that we can sustain the interest and enthusiasm they have shown for this? How do we get beyond the study stage into the doing stage?"

The broader mixture of participants added a dimension to the discussions that isn't usually present at a technical symposium, they said.

"The people who are farthest removed from NASA tend to have the more visionary conceptions of what a Moon base might be like. People who are closest to NASA tend to have perceptions that are highly functional and limited and represent to some extent a Space Station on the moon," Mendell said.

"You get a cross-section of what people think a lunar base might be. Both sides temper one another and their sets of ideas. It was intended to be a conference of engineers, scientists, designers, students, professors, bureaucrats and managers all thrown together and talking to one another."

Third, although the organizers hope to have another conference in two years, this year's was the last to focus exclusively on the idea of a lunar base.

"This was the last lunar bases meeting," Roberts said. "The next meeting will be just Space Activities of the 21st Century. The purpose is to get away from the discussions of going to a place and keep in front of us a discussion of why we're doing these things—and let the why determine the place."

Mendell said that while he still

believes a lunar base is the best place to begin human expansion into the Solar System, there are many similarities in the living conditions, objectives and technologies associated with either a Moon or a Mars base. He said he's confident the Moon base will win out on the merits of its proximity to Earth and its known resources, such as ilmenite from which oxygen should be able to be extracted.

"We've always talked about the lunar base as being much more of an evolutionary follow-on to the Space Station and the whole space transportation capability."

Mendell said his lunar base studies assume that a manned Martian base will be developed next.

"People cannot exist on the surface of Mars without space suits. Your space suit for operating on Mars will not be a lot different than the space suits for operating on the Moon. People cannot work on the surface of Mars for long periods of time without accumulating a radiation dose which is hazardous, so you have the same kind of philosophy of trying to operate machines and automation as much as possible, saving actual physical human labor for special conditions. You are going to want to live under the surface on Mars, just like you'll live under the surface on the Moon, so construction techniques will be very similar.

"My claim is that it's much easier to learn how to do those things on the Moon. I see the Moon as the kindergarten for learning to live and work in space."

Mendell said he's happy with the current direction of the debate.

"I'd much rather be debating whether we go next to the Moon or Mars rather than debating whether we ever leave the Space Station," he said.



A deep drill team obtains cores for petrological studies of the young Aristarchus crater's floor. The peak is a few kilometers to the south of the drill rig. The crater floor shows prominent slump terraces of the crater walls and solidified impact melt rivulets that flowed down the steep inner wall immediately after the crater was formed.

