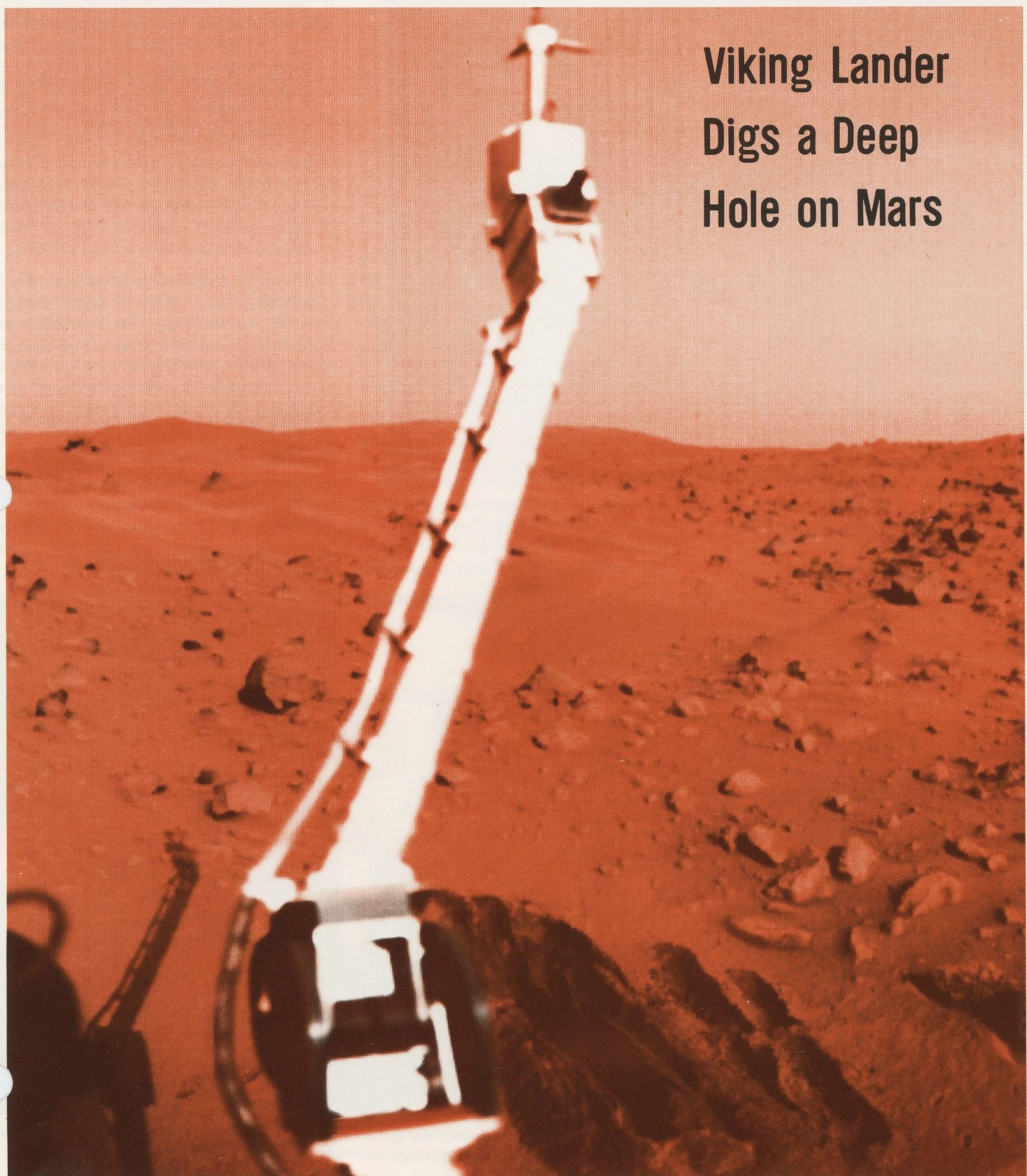


NUMBER 4/1977

**Viking Lander
Digs a Deep
Hole on Mars**



On the cover

The eight-inch deep, 12-inch wide, 29-inch long trench at bottom right in the cover photo was dug by Viking lander 1 in two operations—one in mid-February and the other in early March. The trench was dug by repeatedly backhoeing in a left-right-center pattern. The trench digging was accomplished by one of the most complex command sequences performed by the lander. The command sequence was designed by Donald S. Crouch of the Denver division as one of his last tasks before leaving the Viking project at JPL to return to Denver. The second digging sequence, for example, included 344 commands to the lander. Soil samples from the bottom of the trench will be used first for inorganic soil analysis and later for biology analysis. Information about the soil taken from the bottom of the trench may help explain the weathering process on Mars and may help resolve the dilemma created by Viking findings that first suggest but then cast doubt on the possibility of life in the Martian soil. At left in photo is the meteorology boom used to measure wind speed, direction, and temperatures.

New parking decals are being issued

New decals for access and parking at the division are being issued to all employees. They will be the only ones honored beginning March 21.

The new decals are to be placed on the inside lower left hand corner of the windshield, about one inch above the Colorado state inspection sticker. Old type decals should be removed from the back of the rear view mirror.

Four types of decals are being issued. Yellow diamond and circle shapes and the blue triangular shapes permit parking in reserved areas marked to correspond to the shapes of the decals. The red rectangular shaped decal is for parking in non-restricted and nonreserved areas.

Vehicle decals do not replace the individual employee badge and employees may be required to also show badges for entry to division facilities. Vehicle drivers are responsible to assure that each passenger has a proper badge before entering the facility.

Employee vehicles improperly parked will be ticketed.

If you have not received your new decal by March 14 or need additional decals or information, call plant protection headquarters, ext. 2476.

Shuttle aft flight deck checked

A structure built in the mid-1960s by the division to simulate movement of spacecraft in space is now involved in the nation's next major space program—Space Shuttle.

Because of its versatility and adaptability, the space operations simulator has been used to simulate and test activities on the Gemini, Apollo, and Skylab projects before the current Space Shuttle simulations were begun.

Undergoing simulation at the facility now is a full-scale, high-fidelity Space Shuttle aft flight deck (AFD) mockup with functional controls and displays at the payload and mission stations. The AFD will be used by Shuttle astronauts to handle payloads in the orbiter's cargo bay, including launch, recovery, and repair operations while orbiting the Earth.

In addition to the AFD, the simulator has a full six degrees of freedom moving base carriage; a 12-foot, seven degrees of freedom manipulator arm; and various mockups of the Shuttle cargo bay and large space structures.

Most recently completed simulation was on-orbit, remotely-controlled servicing of a spacecraft. In the simulation, the ailing spacecraft was docked with a simulated

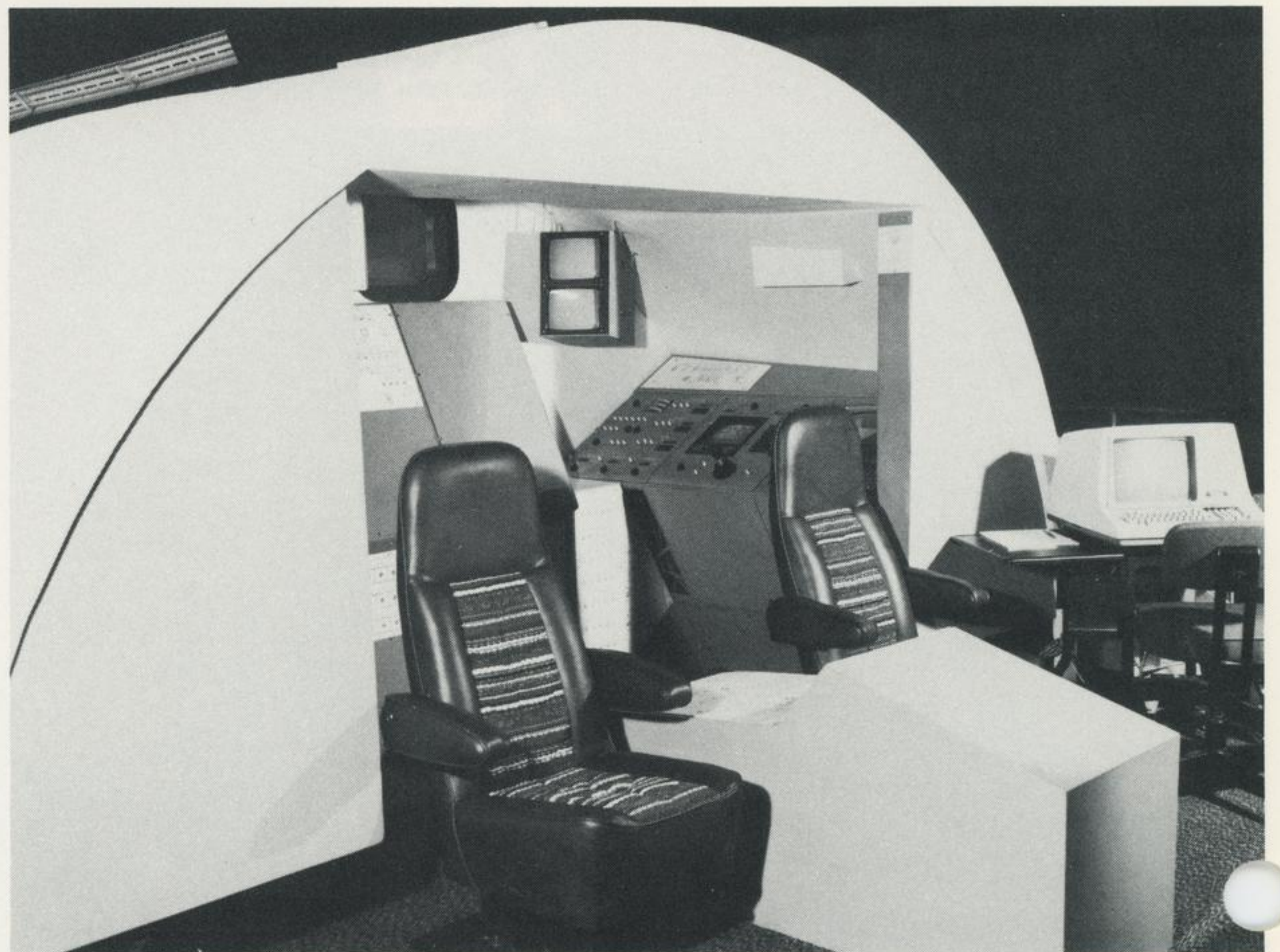
servicer spacecraft while the servicer arm removed the faulty module and replaced it with a new module.

The simulation involved hardware and control concepts developed under a NASA contract for an "Integrated Orbital Servicing Study" the division is performing for NASA's Marshall Space Flight Center (MSFC). W. L. DeRoucher is program manager for the contract and A. E. Wudell directed the planning and implementation of the servicing simulations.

The AFD simulator was constructed under the direction of William Tobey with division capital equipment funds. Tobey is now involved in a proposal effort concerning large space structures.

The current configuration of the controls and displays is based on interim results drawn from a NASA "Payload Specialists Station Study" performed by the division for MSFC. The simulator can be used to examine controls, displays, and crew procedures for single experiments, payloads containing several experiments, and missions composed of several payloads.

Future additions to the facility, including flight computer emulators, will permit development, integration, and verification of flight software for aft flight deck payload operations.



Full-scale mockup of the aft deck for Space Shuttle orbiter includes four black and white and two color commercial-type video systems that can receive signals from video tape or eight video cameras in space operations simulator.

Employee receives SAE award certificate

Richard O. Trummer, a staff engineer in research and development, recently was honored for his contributions to the Society of Automotive Engineers (SAE). A certificate of appreciation was presented at the 1977 SAE annual meeting technical board luncheon in Detroit March 3.



Trummer was cited for his 12-year membership on the electrical connector subcommittee and for his contributions as chairman of that subcommittee from 1973 to 1976.

NASA to honor Viking employees

The National Aeronautics and Space Administration has selected 70 Martin Marietta employees for special recognition for their "exceptional contributions" to the Viking project.

Presentation ceremonies for Denver are being planned by a committee headed by John H. Boyd Jr., director of public relations for the division, and will be held at the north end of the second floor factory. No date has been set for the presentation.

Ceremonies are also being held at NASA's Langley Research Center and at the Jet Propulsion Laboratory.

This is the first time NASA will come to a contractor's facility to present such awards.

Spouses of those to be honored will be invited to attend the function. All employees of the division will be welcome at the 45-minute event.

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Denver Division
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March 1977

Energy conservation program continuing

Severe winter weather in the eastern half of the United States again has focused the nation's attention on the dwindling supply of fuel for heating and power generation to keep homes comfortable and industry operating.

There have been peaks and valleys of interest in energy conservation among the general population. At the Denver division there have been no valleys in interest or effort. Energy conservation efforts have continued at a high rate and the results show it.

Early in 1976, the *Martin Marietta News* published results of 1975 efforts and goals for 1976.

For example, a goal was set to reduce use of electricity by 15 million kilowatt hours, from 84 million to 69 million. Actual use in 1976 was just under 66 million kilowatt hours—a 21.5 percent reduction.

Natural gas consumption was down 11.3 percent.

These are significant savings in energy and efforts are continuing to achieve similar results in 1977.

Although energy has been saved, expenditures for energy remain about the same. Rate increases and fuel cost adjustments have eroded possible dollar savings. (In December, the cost adjustment for natural gas equaled "to the penny" the normal bill for the month, doubling the natural gas cost that month.)

"Costs are important," Ralph L. Stewart, facilities and maintenance services, who is directing the conservation efforts, said, "but our major concern is to save energy. As a responsible citizen of the community and the country, the division must do all it can to conserve the dwindling fuel supplies."

The building automation system that went into operation in June 1976 has contributed to more effective electrical use. Lighting timers formerly used have been eliminated in many areas and more will be eliminated this year. The timers were effective, but controlled larger areas. New light switches are being added which, when coupled with the automated system, make it possible to control power use in individual work areas rather than areas that in some cases included the whole floor of a building.

The automated system also can anticipate electrical demand and cycle power

use so the demand is controlled to save power and money.

"We have reduced lighting, air conditioning, and heating without damage to products, curtailment of testing, or undue inconvenience to employees," Stewart said.

Light levels in work areas have been reduced from 100 foot candles to about 70 foot candles. According to the American National Standards Institute, 50 foot candles is an acceptable level.

(Editor's Note: Stewart's office was lighted to 50 foot candles and we had no difficulty reading even the fine print on drawings.)

"We have kept light levels somewhat higher in areas where finely detailed work or critical instrument calibration is going on," Stewart said. "However, instead of keeping the entire area at a higher level, we have kept overall lighting lower and added portable, supplemental lighting when needed for individuals in those areas."

Thermostats have been set at 65 degrees in most areas, but remain higher in some isolated areas because of product, test, or contract requirements.

"If we don't practice every conservation measure possible now," Stewart said, "we simply won't have energy to conserve—or use—in the years ahead."

Security inspection shows employee ability

"All employees contacted during the recent Department of Defense security inspection are to be commended for their cooperative attitudes and knowledge of security procedures," W. L. Miller, chief of security and plant protection, said in reviewing the results of the inspection.

"We are generally in compliance with all security requirements," he said, "and the inspectors noted what could be called only minor deficiencies."

Among the deficiencies were incorrect or incomplete marking of classified documents, retention of documents beyond need, and care of working papers.

"During the inspection," Miller said, "government representatives made many favorable comments regarding the knowledge and care exhibited by employees in handling classified information."

Canaveral, Vandenberg employees cited for outstanding achievement

Twenty-seven Denver division employees—16 at Vandenberg and 11 at Cape Canaveral—were honored recently for outstanding achievement on the launch vehicle program.

Top awards at Canaveral flight operations went to James D. Kershner, who received the launch vehicle success award; and to George H. Meyer and Roger B. Wright, who received the launch vehicle readiness award.

At Vandenberg, the launch vehicle flight success award was presented to James McMullen and Joe Savidge while Steve Bullock, Walter Hoskins, and Richard Ligon received the launch vehicle flight readiness award. Charles Holt received special recognition for an innovative idea.

Others receiving the coveted Gold Medalion for outstanding achievement or for performance beyond their assigned duties were:

At Canaveral Flight Operations: Maylon L. Butler, Ronald N. Halcomb, John G. Krall, Richard J. Kroc, Haynes L. Lindsey, Thomas H. Munro, Margaret J. Reece, and Junior L. Stark.

At Vandenberg Flight Operations: James May, Barbara Tempalski, and Mat Zepeda.

At Vandenberg for Ground Support System: Paul Dailey, C. Jay Griffith, Richard Parish, Fred Patzwald, Norman Roulston, Lester Trout, and Bette Waddell.

Awards at Cape Canaveral were presented by John A. Coryell, director of Canaveral flight operations.

Participating in the ceremony at Vandenberg were C. E. Carnahan, vice president for launch vehicles; F. J. Scheffler, director of Vandenberg flight operations; and R. D. Rhodus, ground support system project director.



Top awards for outstanding performance at Canaveral flight operations were received recently by, from left to right, Roger B. Wright, James D. Kershner, and George H. Meyer.



James R. McMullen, at left in top photo, and Joe Savidge, at left in bottom photo, received top launch vehicle flight success award at Vandenberg flight operations. C. E. Carnahan, vice president for launch vehicles, at right in both photos, presented the awards.

On the move

Recent position changes include:

L. A. Kilstrup: from administrator, proposal management to chief, proposal management; responsible for directing the preparation of business management volumes for new business proposals.

W. D. Wolfe: from chief, quality procurement to chief, requirements, shipping, and procurement quality; responsible for raw material and piece parts testing and shipping of end items.

Salvatore Caporale: from general supervisor launch vehicle factory quality to chief, quality procurement; responsible for itinerant and resident source quality personnel.

J. C. Dole: from group engineer test operations at JPL to chief, program manufacturing; responsible for manufacture, assembly, and test on the Solid Rocket Booster program.

The Economic Facts

Paycheck protection

(Editor's Note: The annual payroll savings campaign for U.S. Savings Bonds will begin at the division April 10. Robert Garcia will coordinate the campaign. The following article offers some advice on budgeting and saving from the payroll savings plan committee.)

The average American spent more than he made last year. So if debt is your problem, don't feel that you are alone.

These days, paying the bills can wreck a family's finances. It takes planning to cut back on spending, hunt for bargains, and shop for value.

These days, you need more out of each dollar. You need a budget that neither bores nor bothers.

Start by gathering records of income and expenses for the past several months. Haul out checkbook stubs, credit card statements, and cash receipts to spot your personal spending pattern.

Find out where your money comes from and where it goes. Note how much and how often.

Take a sheet of paper and make a column for *net income*. Count your salary and any other constant earnings. Divide the total by 12 to get the monthly figure.

In another column, label unchanging monthly obligations *fixed expenses*. These should be constant items like house payments, taxes, car payments, and insurance premiums.

You will have more control in your *flexible expenses* column. These should be things like utilities, auto gas and oil, and lunches.

Don't try to project flexible expense more than three months ahead, but do plan for vacation travel and holiday gifts.

Now look at your savings. Are you saving for education or retirement? How about a financial spare for those unplanned budget blowouts?

If debt is your problem, don't feel alone. Join the millions of Americans who buy U.S. Savings Bonds, the most widely held security in the world.

Start a budget now. And protect it with your payroll savings plan.

From Michoud

Fabrication group sets safety mark

A second shift fabrication group at Michoud has worked 10,282 hours without an injury of any kind.

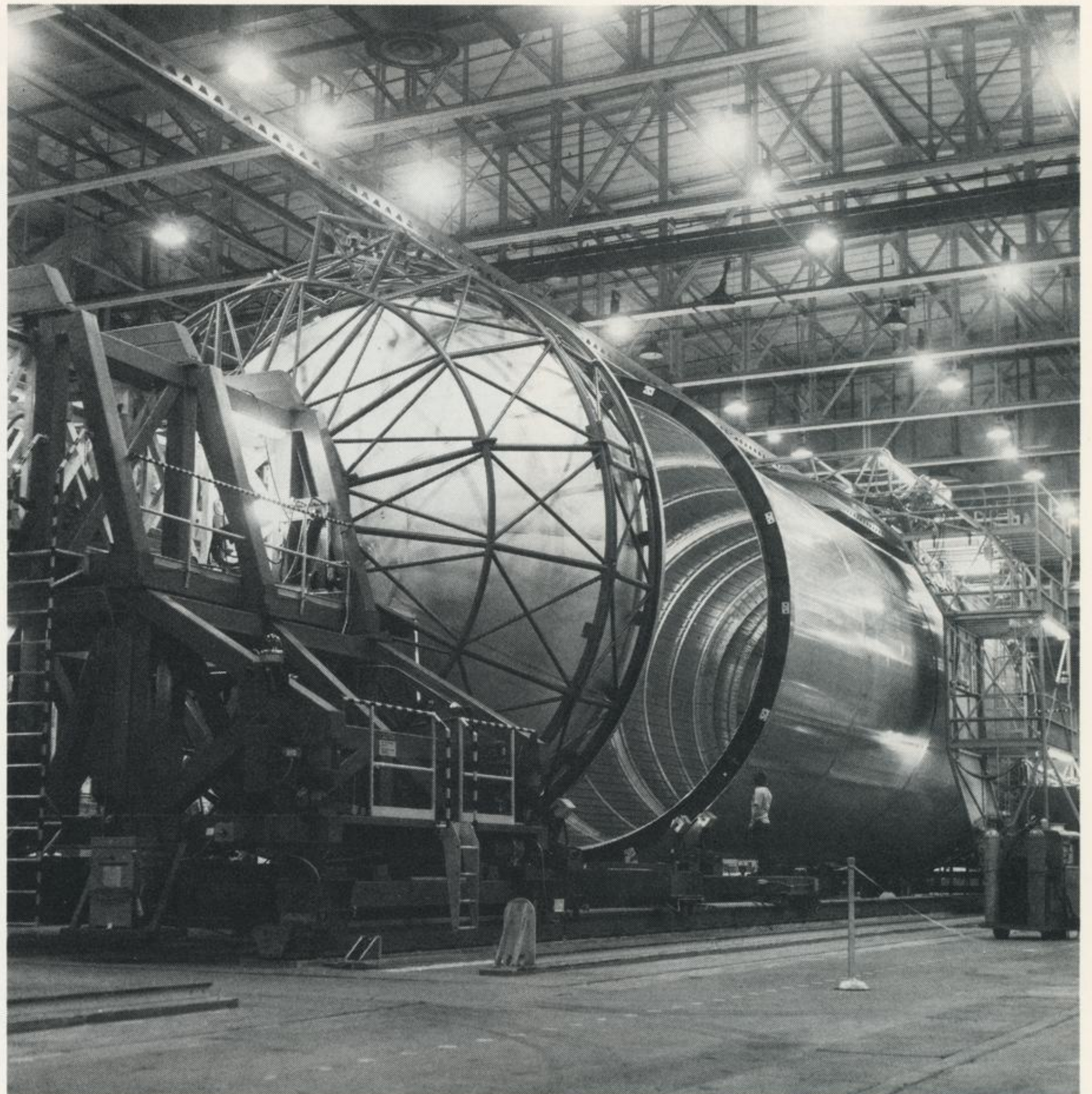
"September 26, 1976 was the last time a Mitch 15 form was used in this group," Frank Peters, general foreman of the second shift, said. He explained that a Mitch 15 is a government form that must be completed before an employee can receive on-the-job first aid "no matter how small the injury, cut, nick, or scratch."

The employees, supervised by Ed Frost, were doing fabrication and maintenance of external tank tooling in the main manufacturing building as well tool fabrication and assembly of various cells in the vehicle assembly building.

Included in the group are William Hawkins, Lee Cason, Louie Francez, Pat Conner, and Howard Turbyfill. Kevin Welch and Maurice Hawkins were part of the group before returning to full-time college studies.

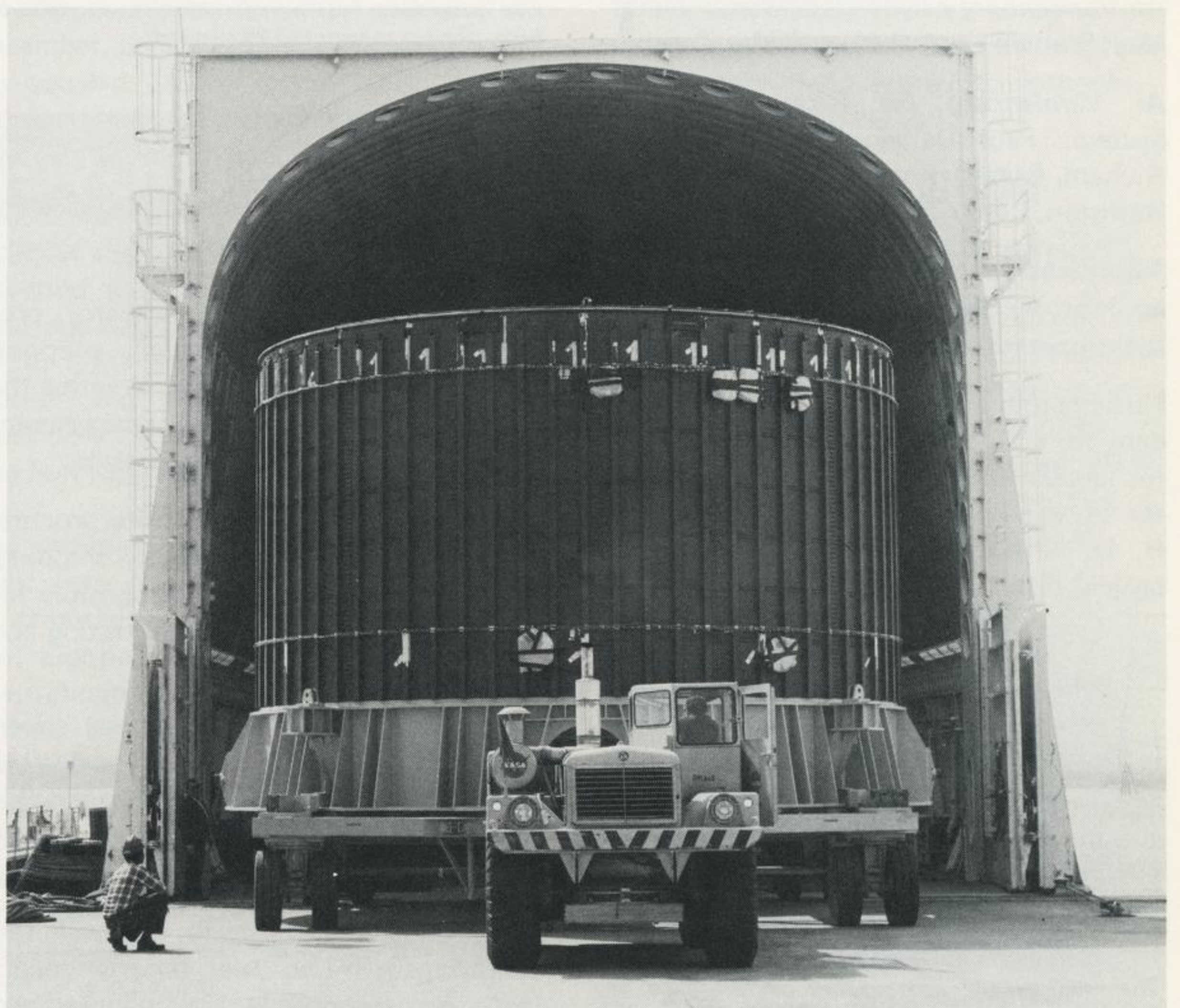


Machinist James Matthews adjusts a tape-controlled Omnimil before machining a fuel suction fitting that will be welded onto the liquid oxygen tank dome of the external tank. The machine can perform seven different operations from its taped program.



Final component of the gigantic liquid hydrogen tank for the main propulsion test article is the forward dome. It is shown here in position

on the major assembly tool for trimming and welding. Awaiting mating with the dome is a 32,000-pound, 88-foot, all aluminum tank.



Liquid hydrogen simulator and load ring for the intertank structural test article are loaded aboard the NASA barge Orion for the trip from Michoud to Marshall Space Flight Center in Huntsville, Ala.

First external tank hardware delivered ahead of schedule

MARTIN MARIETTA
news
MICHLOUD OPERATIONS

The intertank structural test article (ISTA), the first external tank hardware delivered by Michoud operations was accepted by the customer Feb. 21—ten days ahead of schedule.

The three major pieces of the ISTA—an intertank, a liquid oxygen simulator, and a liquid hydrogen simulator—are being transported to NASA's Marshall Space Flight Center in Huntsville, Ala. aboard the NASA barge Orion. At MSFC, the ISTA will undergo an eight-month series of structural tests. Bill Barrett, structural test article program manager for Michoud operations, will supervise a group from Michoud that will support the test series at Huntsville.

The structural test article schedule calls for delivery in December 1977 of completed liquid oxygen and liquid hydrogen tanks for further structural testing.

"The delivery of the test articles ahead of schedule represents a dedicated effort across all disciplines at Michoud," Barrett said, "and is consistent with what I have come to expect of the external tank team."

James B. Odom, external tank project manager for NASA at MSFC, accepted the ISTA hardware on behalf of NASA following certification by George Rodney, director of product assurance at Michoud, and Audie O. Mitchell, quality assurance engineer for Defense Contract Administration Services.

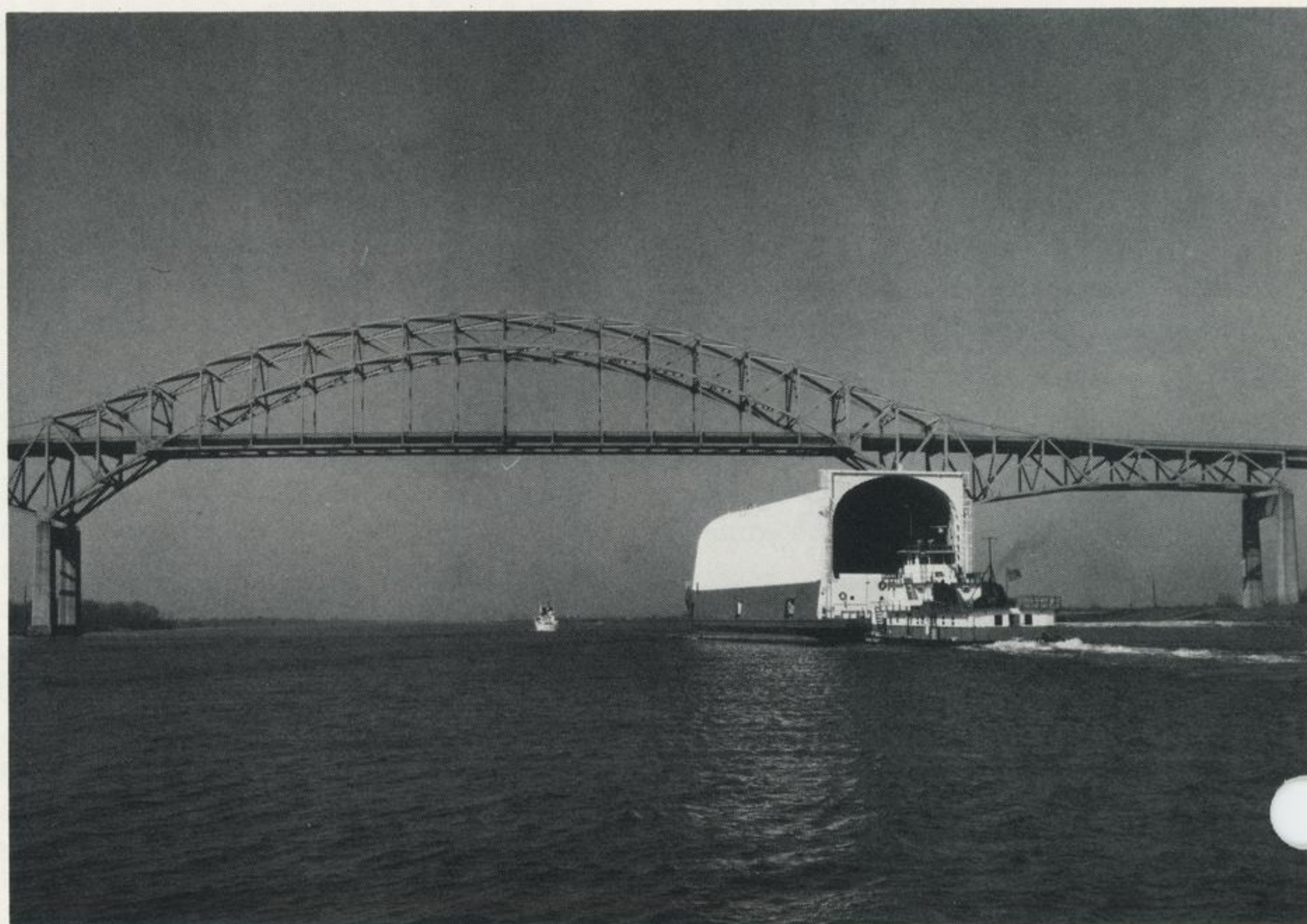
Also accepted by NASA and making the trip to Huntsville aboard the Orion, was a liquid oxygen tank modal survey ring to be used in later tests. The ring was not scheduled for delivery until December 1977 but was prepared and shipped early at NASA's request.

The Orion left at 9:45 am Feb. 25 on its 1100-mile trip to Huntsville. It is scheduled to arrive March 11.



Audie O. Mitchell, seated at right, quality assurance engineer for Defense Contract Administration Services, is shown certifying that all contractual requirements have been met for delivery of the first test article of the external tank from Michoud. Seated with Mitchell is

George Rodney, director of product assurance for Michoud operations. Standing, left to right, are James B. Odom, external tank project manager for NASA, and George E. Smith, vice president and project director of Michoud operations for Martin Marietta.



NASA barge Orion heads for the Mississippi River from Michoud with first delivery of hardware for the external tank program. The barge is due in Huntsville, Ala. March 11.

In Michoud

Call C. H. Fleischer at 3835 with suggestions or information for articles for Martin Marietta News.