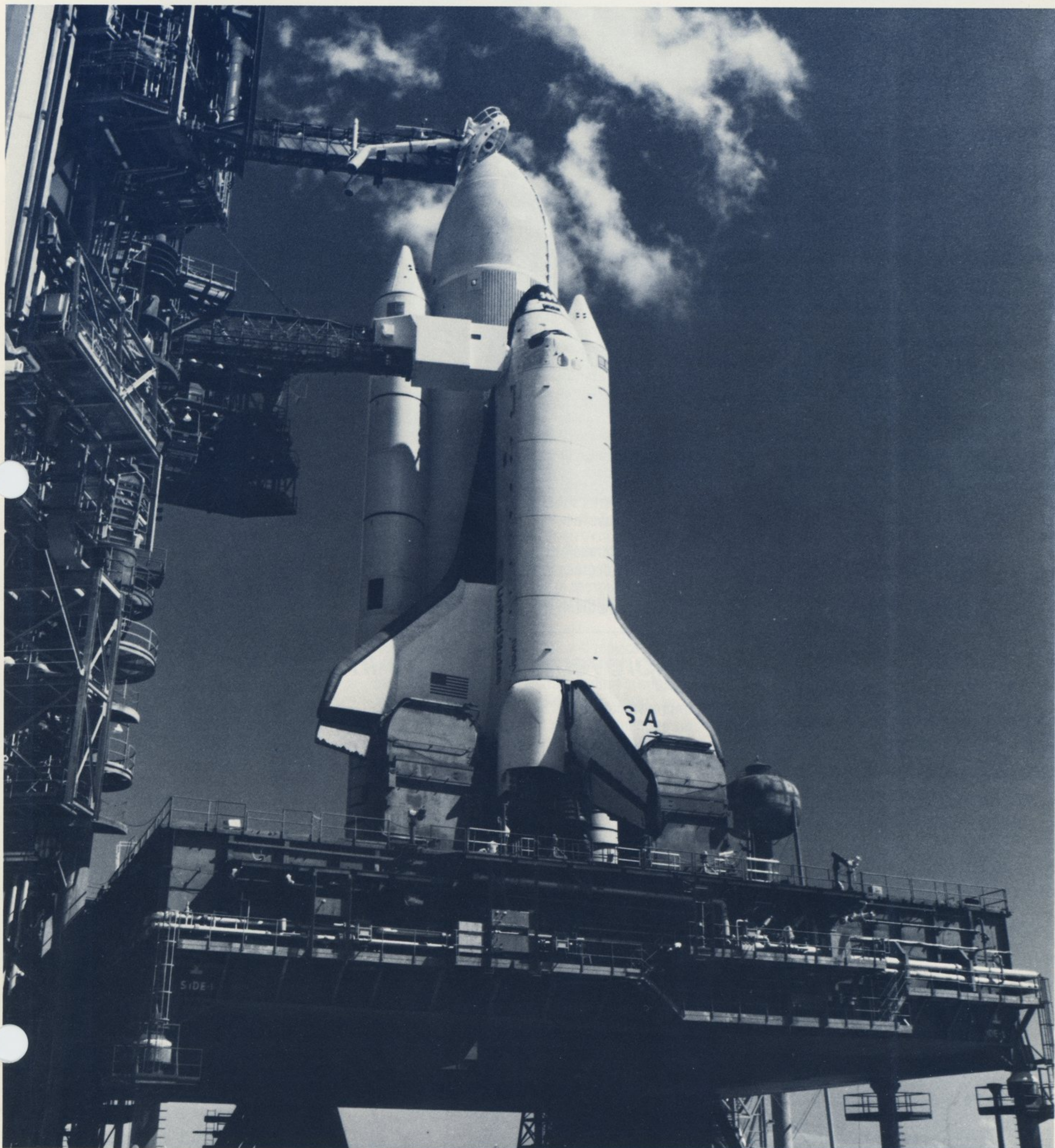




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MARTIN MARIETTA  
**news**  
DENVER AEROSPACE





# Shuttle launch likened to 18-story castle lift-off

(The following story was prepared, and this issue of *Martin Marietta News* was sent to the printer before the scheduled November 4 launch of Space Shuttle for its second mission.)

With its rocket booster and fuel tank spires, Space Shuttle takes on the appearance of Cinderella's castle rising 18-stories above the ground. The tremendous force required to get the castle-like marvel off the ground is provided by twin rocket boosters, each producing 2.6 million pounds of thrust, and by the orbiter's three engines producing 375,000 pounds of thrust at liftoff.

The structural backbone of the vehicle is the external tank which provides liquid propellants to the orbiter engines.

The external tank is the Shuttle's largest element and has 481,450 parts. That includes bolts, nuts, washers, valves, aluminum panels, pressurization lines and more. There are 200,000 feet—about 38 miles—of electrical wiring, 1000 feet of insulated sleeving, 50 feet of coaxial cable, 25,000 feet—4.7 miles—of tape, 7000 feet of safety wire, and 6000 pounds of thermal protection system materials. More than one-half mile of welding joins the aluminum panels that form the tank.

For the external tank, big is really big. It is 154 feet long and nearly 28 feet in diameter. It holds nearly 1.6 million pounds of super-cold propellants. Liquid oxygen is at minus 297 degrees Fahrenheit and the liquid hydrogen is minus 423 degrees.

To put these dimensions, capacities, and temperatures in perspective:

On his historic first flight, Orville Wright flew 120 feet—34 feet short of the length of the external tank.

Four men, each six feet tall, could stand on each other's shoulders inside the tank and the top man still could not reach the opposite wall.

If the tank was used as a gasoline storage tank, it would hold a year's supply of fuel for 2,114 motorists each driving 10,000 miles at an average of 40 miles per gallon.

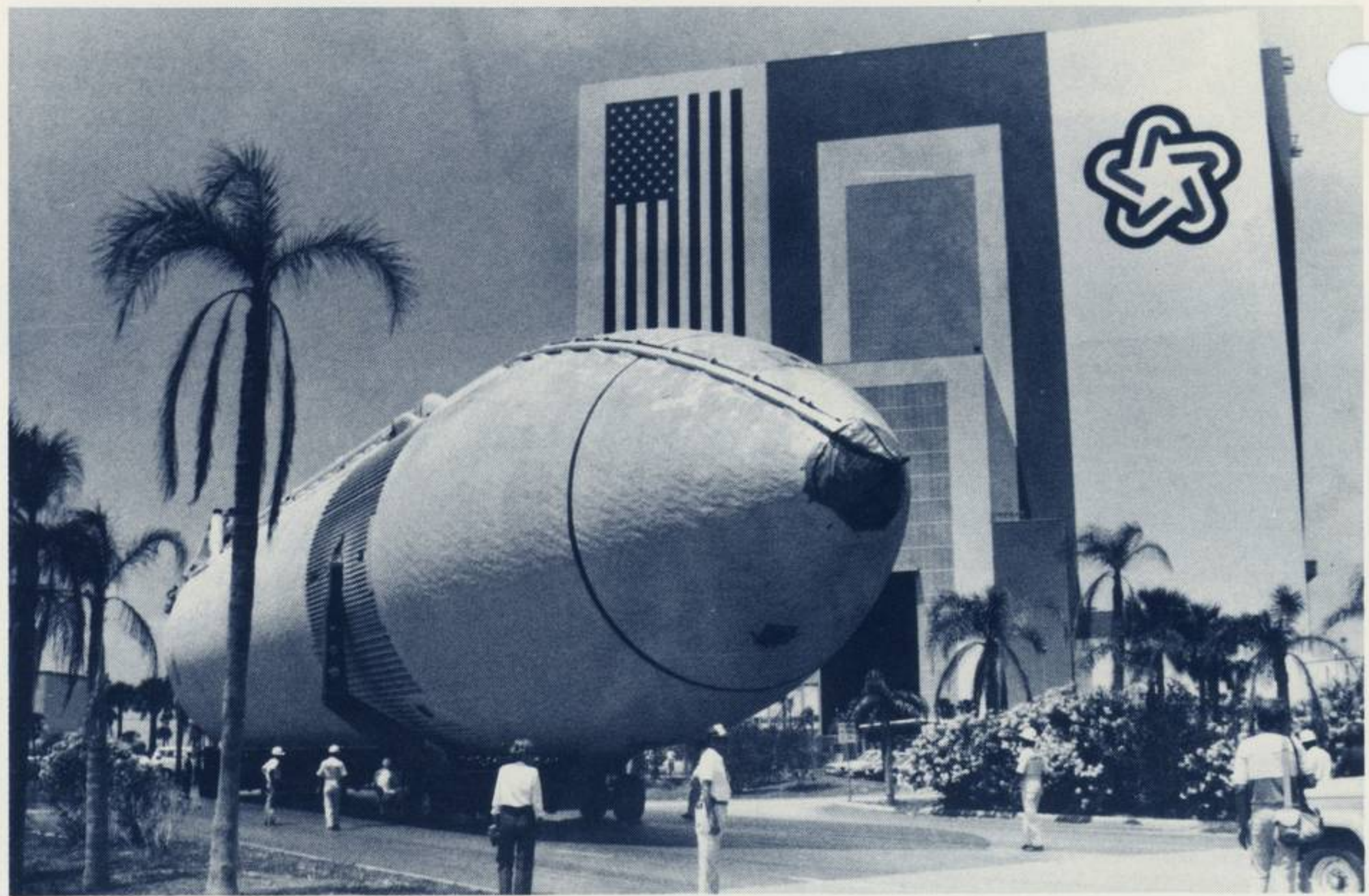
## Hurtt elected AAS fellow

C. B. Hurtt, Denver Aerospace president, has been elected a Fellow of the American Astronautical Society.

He was inducted at the awards luncheon of the organization's 28th anniversary conference in San Diego October 27.

Astronaut Robert Crippen was also inducted as a Fellow.

Joseph C. Spencer, director of program development at the Michoud division, has been elected a director of AAS and took office at the conference.



The external tank for the second Space Shuttle flight is shown as it arrived at Kennedy Space Center. The tank is the structural backbone for Shuttle.

Propellants are fed to the orbiter's engines at the rate of 1035 gallons a minute—that's enough liquid every 18 seconds to fill a medium-sized backyard swimming pool. And there is enough liquid in the tank to fill 29 such pools.

If the propellants were gas instead of liquid, the tank would have to be 25 miles tall to hold them.

The coldest temperature ever recorded on Earth is minus 83 degrees F; on Mars it gets down to minus 190 degrees in the winter. Physics majors will recall that the coldest it can get is absolute

zero—that's minus 459.6 degrees F. The liquid hydrogen is minus 423 degrees; the liquid oxygen is considerably warmer at minus 297 degrees. Even though fingers sometimes freeze to an ice cube tray, they do not stick to the outside of the tank because of the insulation.

The 77,000-pound tank carries propellant weighing about 1,590,000 pounds. That's a weight-to-load ratio of 1:21; a standard pickup truck weight-to-load ratio is 3:1.

The external tank is big—and it is efficient.

## Improvements made in group insurance plan

Improvements have been made in the salary group insurance plan beginning with claims incurred November 1, 1981.

The dollar conversion factor has been increased for anesthetic, surgery, diagnostic x-ray and laboratory services for active and retired salary plans. The conversion factors are: Denver, \$15.00; Canaveral, \$16.00; Vandenberg, \$20.50; and New Orleans, \$16.00. Employees in other locations should contact the employee benefits office for the conversion factors.

### On the cover

**The Space Shuttle is shown in launch configuration on the pad in preparation for the second mission. The rotating service structure has been rolled back to conduct two tests, a cryogenic tanking test and an overpressure modification test.**

Ambulance charges for transportation to a hospital for emergency care within 48 hours of an accidental injury are payable under the basic plan hospital services and supplies.

Coverage will be provided for a second surgical opinion when elective, non-emergency surgery has been recommended. The plan will pay 100 percent of reasonable customary charges. Arrangements for the second opinion should be made with the employee benefits office.

Outpatient chemotherapy treatment will be covered under the basic plan hospital benefits.

A conditional claims provision has been added which provides that payment will not be made under the policy for expenses in connection with an accident to the extent that the employee receives duplicate payment for those expenses from a legally liable third party.

All questions on the insurance plan and its improvements should be directed to the employee benefits office, Ext. 3009.



## New technology awards go to six employees

Cash awards for new technology disclosures have been presented to six employees as a result of their work on NASA contracts. Those receiving the awards and their new technology disclosures were:

Robert L. Berry, Leonard J. Demchak, and James R. Tegart, engineering mechanics: an analytical tool for simulating large amplitude propellant slosh, and measurement of the forces due to liquid motion in subscale tanks.

Remi C. Engls, engineering mechanics: a new payload integration method.

Joseph F. O'Dell, ground electronics production systems: packaging of transformer coil winding.

Frank E. Winner, external tank operations (KSC): explosion proof electronic position indicator.



Joseph F. O'Dell displays a printed circuit board incorporating the encapsulated transformer which he developed on the checkout, control, and monitoring subsystem (CCMS) contract. He has received a new technology award for the time and labor saving packaging.

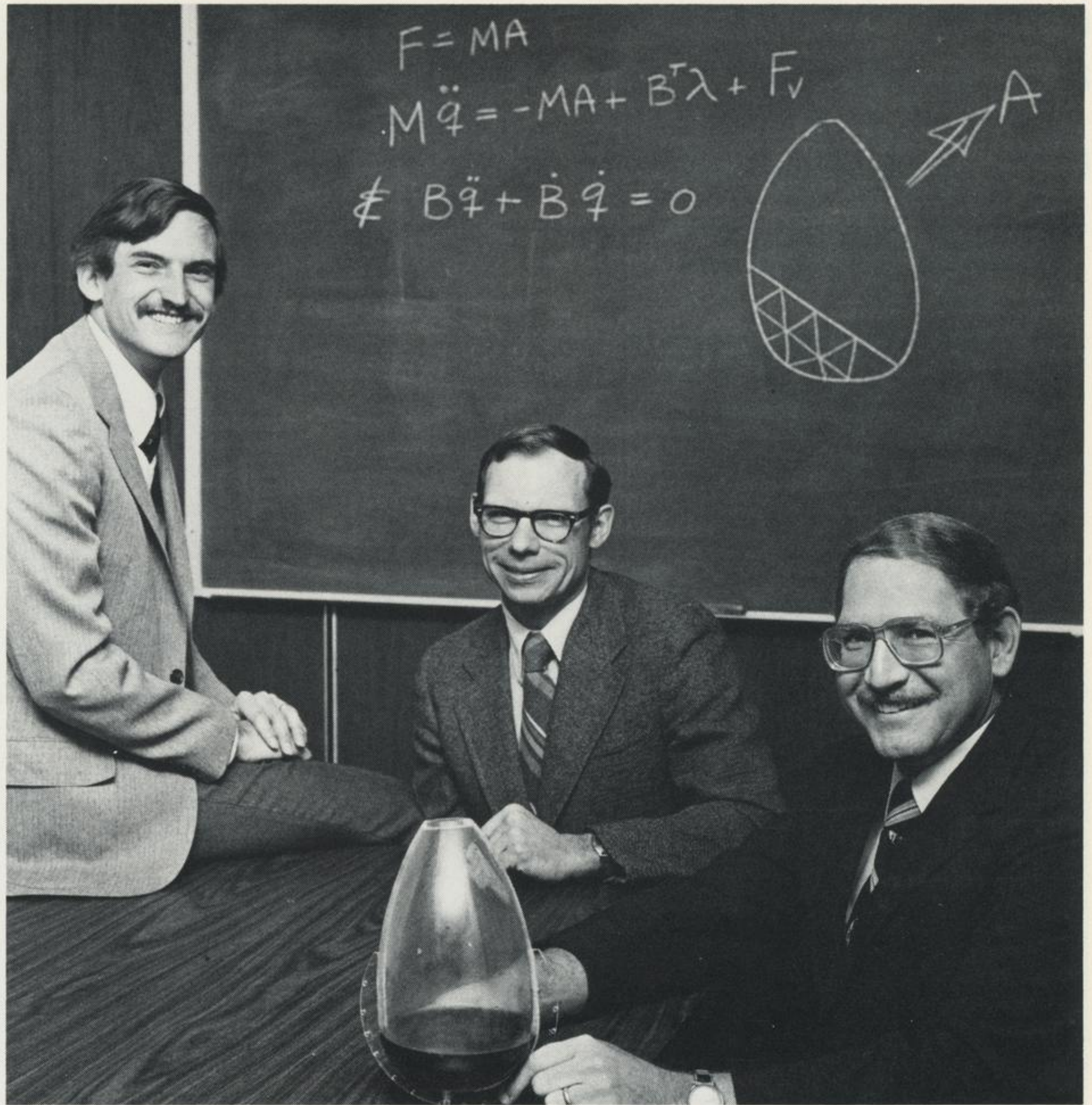
## Easter Seal Society honors employees

Denver Aerospace employees have been added to the 1981 Colorado Easter Seal Honor Roll for their contributions to the Easter Seal Society.

This year \$2500 was contributed to the organization from Operation Santa Claus, an employee-operated assistance program begun in 1959.

The honor roll was presented at the annual meeting of the Society in Glenwood Springs and becomes a part of the official records of the organization.

Francis Steers, executive director of the Society, in announcing the honor, said, "Please know we value your friendship highly and appreciate your splendid support."



Leonard J. Demchak, James R. Tegart, and Robert L. Berry are shown with a tank model used to validate their work on an analytical model for simulating propellant dynamics during a Space Shuttle return to launch site abort. They received a new technology award for the work.

## Ridesharing gets boost from RTD discounts, carpool registration

New carpool parking stickers will replace the expired green circle stickers by December 17 as part of the annual carpool registration effort in cooperation with Denver Metro Rideshare Week.

"Ridesharing, which includes carpooling, bus riding, biking, and walking, is vital to the control of Denver's air pollution problem," said Lori A. Sharp, share-the-ride coordinator.

To register existing carpools and assist in the formation of new ones, Ms Sharp will be at the following locations:

ENG 1st floor cafeteria, south entrance	Nov. 10 10:15 am—12:30 pm
SSB lobby	Nov. 11 10:15 am—12:30 pm
SLF	Nov. 11 2:00 pm—3:30 pm
DSC lobby	Nov. 12 11:00 am—1:00 pm
GCF 6050	Nov. 13 8:30 am—11:30 am

Available at the share-the-ride office, Eng. 124G, are carpool certification forms and discounted RTD tokens and monthly passes. Fifty-token rolls of 35-cent RTD tokens are \$15.75, a 10 percent discount. Monthly RTD local passes cost \$24, a 20 percent saving on the cost of 44 regular fares, and offer unlimited rides.

Ninety percent of Denver's major air pollutant, carbon monoxide, is produced during morning and evening rush hours. Automobiles operating above 4000 feet emit 200 percent more carbon monoxide than the same cars at sea level.

"If we could get every person who is driving to work alone to get one other person to ride with him or her, we could virtually solve Denver's carbon monoxide problem overnight," said Dr. James M. Lents, director, air pollution control division, Colorado Department of Health.

### MARTIN MARIETTA NEWS

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Call Ext. 5364 with information or suggestions for articles, or call one of the following coordinators.

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 External Tank Operations (KSC): Melodie deGuibert 3160  
 Vandenberg Operations: William Leary 2202

DENVER AEROSPACE

P. O. Box 179—Denver, CO 80201  
 November 6, 1981



## Canaveral employees aid United Way drive

Felix J. Scheffler, director of Canaveral operations, has been named chairman of the Brevard County United Way 1981 fund drive and two other employees are assisting in the campaign.

Others working with the organization are Sally J. Smith, materiel, who is serving on the budget review panel, and H. Ritchie McConahy, test operations, who is a loaned executive.

At the kickoff banquet chaired by Scheffler, pledges totaled about 20 percent of the \$1.5 million goal.

James Mathena, chief of security, is chairman of the employee campaign at Canaveral operations. The employee goal is \$30,000 and 100 percent participation.

## Recreation

Information on all clubs and activities may be obtained from the recreation office, Eng. 124, Ext. 6750.

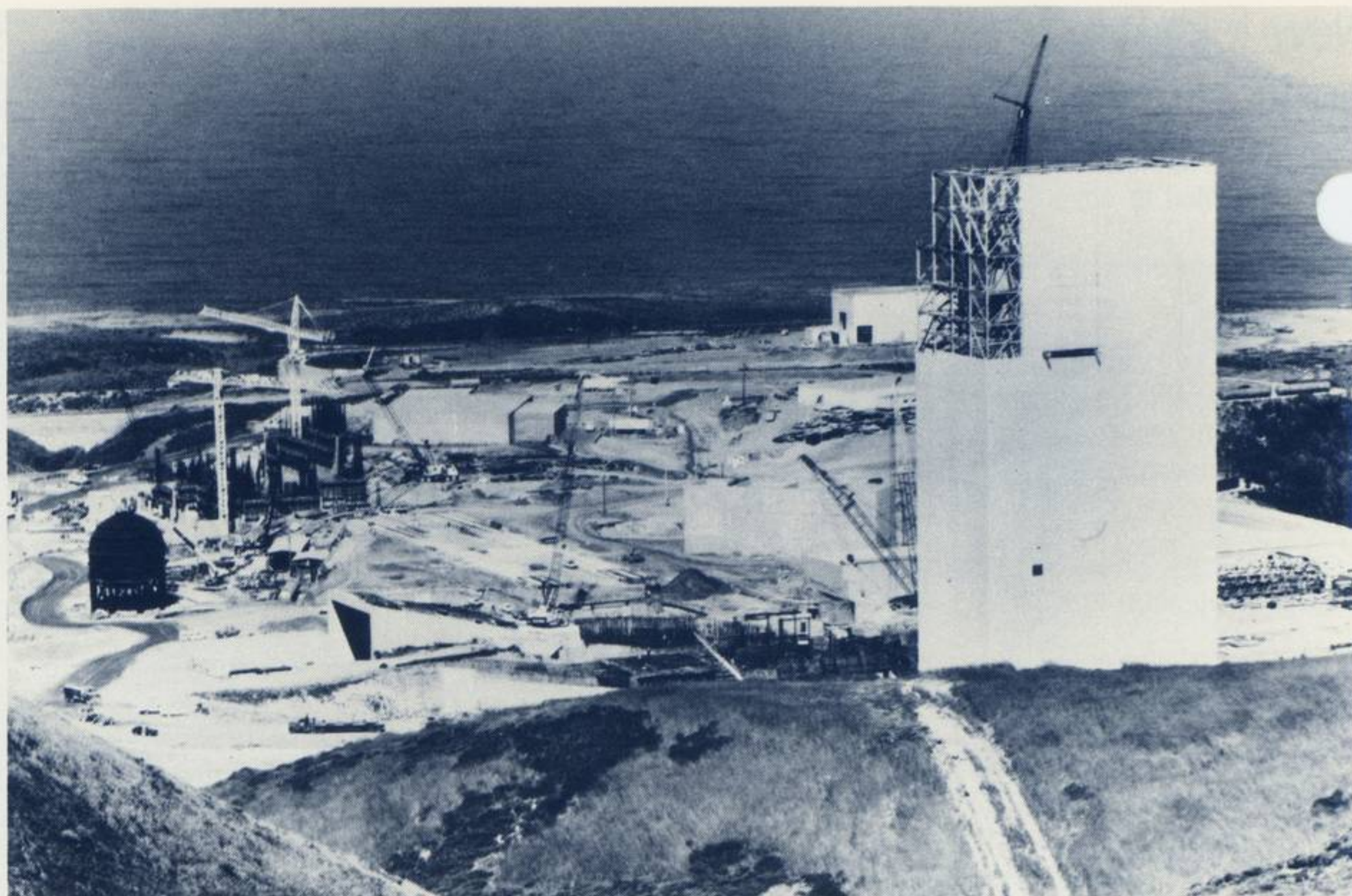
**Fitness**—Women's fitness classes will begin November 9, with sessions Monday and Wednesday from 5:00 pm to 6:00 pm DSC 200K. Cost for the six-week program is \$10. Class size is limited. Participants may register and pay at the first meeting. Checks are to be payable to Melissa Guynn, course instructor.

**Dance**—The Countdown square dance club will meet November 12 at 1381 Iola St., Aurora. B. T. Rotruck will lead round dances beginning at 7:30 pm; John Chavis will call square dances beginning at 8:00 pm.

**Theater**—Matinee tickets for the December 12 showing of *Mame* at the Boulder Dinner Theatre, 55th and Arapahoe, are available at a \$4.00 discount. The \$13.45 adult ticket includes dinner, pre-show entertainment, and the main show. Dinner is served beginning at 12:15; the main show is at 2:00 pm. Reservations and checks to the Boulder Dinner Theatre are due in the recreation office by November 20.

**Fishing**—Entry forms for the National Industrial Recreation Association 1981-82 fishing contest are available at the recreation office.

**Radio**—The 1982 program of the Waterton Amateur Radio club will be planned at the November 3 meeting of the group. The meeting will be held in the club rooms in the recreation area beginning at 5:00 pm. Call Harold E. Beaver, Ext. 6051, for information.



Rising more than 100 feet above the Pacific Ocean in the background is the payload preparation facility—part of Space Shuttle launch facilities taking shape at Vandenberg Air Force Base. Scheduled for completion in late 1984, the structure will be used to check out payloads for the Shuttle orbiter. Denver Aerospace, the integrating contractor for the U.S. Air Force, is responsible for the development of the Vandenberg launch facilities. The first Shuttle launch from the base is scheduled for 1985.

## Two are elected to board of directors

Melvin R. Laird and A. James Clark have been elected to the Martin Marietta Corporation board of directors. The elections bring board membership to 14, all but two of whom are independent, outside directors.

Laird, former Secretary of Defense, is senior counsellor to the Readers Digest Association on national and international affairs. Clark is president and chief executive officer of Clark Enterprises, Inc., a holding company with headquarters in Bethesda, MD.

Laird, 59, is a native of Nebraska. He was educated at Carleton College in Wisconsin, receiving a BA degree in 1942. Before becoming Defense Secretary, he served nine consecutive terms as a U.S. Representative from Wisconsin.

Clark is a Regent of the University of Maryland, from which he graduated in 1950 with a BS degree in civil engineering. He is 53 and lives in Easton, MD.

## Corporation files note registration with SEC

Martin Marietta has filed a registration statement with the Securities and Exchange Commission for a proposed public offering of \$100 million of Notes due 1987. Blyth Eastman Paine Webber Incorporated and Goldman, Sachs & Co. have been designated co-managers of the underwriting group that plans to offer the Notes to the public.

Proceeds from the sale of the Notes will be used for the corporation's capital expenditures and stock repurchase programs and for working capital requirements.

## Employees earn award for technical paper

Three employees have been honored for producing the best paper of 1980 in judging by the International Society for Testing and Failure Analysis.

Honored were James R. Beall, William E. Echols, and David Wilson, all of technical operations.

Their paper was entitled, "SEM techniques for isolation of failures in memory technology."

## Employees win awards in Governor's Cup race

More than 20 employees ran in the 10-kilometer Governor's Cup race in October, with age-group awards won by Thomas E. Bailey, strategic systems division; and Robert D. Working, data systems.

Bailey won the 50-plus class by three minutes with a time of 34:49. Working took sixth place in the 40-44 age group with a time of 35:44.

The Governor's Cup attracted 3600 runners, Colorado's second largest field this year, and included world-class runners Frank Shorter, Tony Sandoval, and Kirk Pfeffer.

## Performance sharing plan unit values set for September

Unit values for the Performance Sharing Plan reported as of September 30, 1981, were:

Fund A (Indexed Equity): 1.4361509920  
Fund B (Fixed Income): 1.3988488398