

MARTIN MARIETTA

# news

DENVER AEROSPACE

NUMBER 23/1982

Fifth Shuttle launch  
splits Florida skies



# First commercial Shuttle is picture perfect

Space Shuttle began its first operational flight without a flaw November 11.

With the Michoud division's external tank feeding fuel to its engines, STS-5 lifted off from Kennedy Space Center right on time—5:19 a.m. (MST). Cheers of the viewing crowd almost equaled the ear-splitting roar of the Shuttle's engines.

And cheers filled the morning air again as the pyrotechnic initiator controllers did their first job—exploding bolts that separated the solid rocket boosters from the vehicle. Separation occurred as the vehicle was still in view, about 28 miles down range from the launch site.

The boosters rode back to earth beneath the parachutes of the solid rocket booster system developed here. They will be retrieved and refurbished for use on another flight.

Some eight and one-half minutes after launch, the pyrotechnic initiator controllers went into action again, separating the external tank from Columbia. The external tank is the only expendable part of the Shuttle.

The first Denver Aerospace produced equipment used for Shuttle flights completed its work just before Columbia was launched. The checkout, control, and monitoring subsystem performed its data processing, control and monitoring operation from the time the long countdown began up to launch. The CCMS is part of the launch processing system that manages all Shuttle processing ground activities up to lift-off. Operators control pre-launch operations from consoles in the launch control center. The consoles perform automated test sequences, display test data as tests are performed, and provide a means of recalling historical data, trend analysis, and engineering and management data from the central sub-system.

STS-5 was the first with a four-member crew. Vance Brand flew as commander and Robert Overmyer as pilot. William Lenoir and Joseph Allen were the mission specialists.

Lenoir and Allen were responsible for launch-

## Michoud 'team' cheers STS-5 launch

Among NASA's guests at the launch of the Space Shuttle were members of the first Michoud quality circle working on the external tank.

Selected by NASA during its first competition among Shuttle contractors, members of the Mechanical Assembly Systems Refinement Team who viewed the launch were Bethel Pierce, team leader, Charles Englebracht,

### On the cover

The first operational Space Shuttle lights up sky and water as it lifts off from launch complex 39 at Kennedy Space Center for its five-day journey in space.

ing Shuttle's first commercial payloads, two communications satellites.

The satellite business systems (SBS-C) satellite spun out of Columbia's cargo bay eight hours after lift-off. The Canadian built Telesat-E made its exit into orbit about 24 hours later.

SBS is designed to provide communications for large industries, government, and other users. Telesat-E, also called ANIK-C, will provide voice and television communications to a trans-Canada network of earth stations.

While in orbit, Columbia also used locally produced reaction control system fuel tanks which provided pressure-fed propellants to the orbiter's thrusters. The thrusters were also used on reentry.

Available to the crew, if needed, was the caution and warning electronics. Alarms and visual warnings would have alerted the crew to any malfunctions.

Although final reports are not in, all indications are that all Denver Aerospace equipment performed well.

Kenneth Budd, Manuel Martinez, Gregory Calderone, Doris Revere, Juan Olivares, David Mitchell, Stanley Morand, Spurgeon Frost, Raymond Tetens, Kevin Gauley, William Schmitz, Jr., Daryl Smith, and David Rawson.

NASA administrator James Beggs, speaking at the astronaut reception, singled out the team, and commended them for their contribution to mission success.

Norman R. Augustine, president of Denver Aerospace, presented commemorative plaques to the team members at a dinner held the following night, congratulating them and other guests.

Among the guests from Michoud and subcontracting companies which manufacture parts for the external tank were Kay Seaner, Larry Songy, and Lance Mercier.

Other Michoud employees on hand for the launch were Vernon Brett, manager, facilities; Jon Dutton, chief, engineering, Arnold A. Gustafson, Jr., manager, facilities; Gerry Gilmer, chief, quality; Enos Cozier, facilitator, Mechanical Assembly Systems Refinement Team; John Thompson, KSC ET Operations, and Angelo Rizza.

Rizza marked his retirement after 46 years with the company by attending the launch. He began work in Baltimore, and finished his career as section chief in production control at Michoud.

## SPADOC proposal is submitted

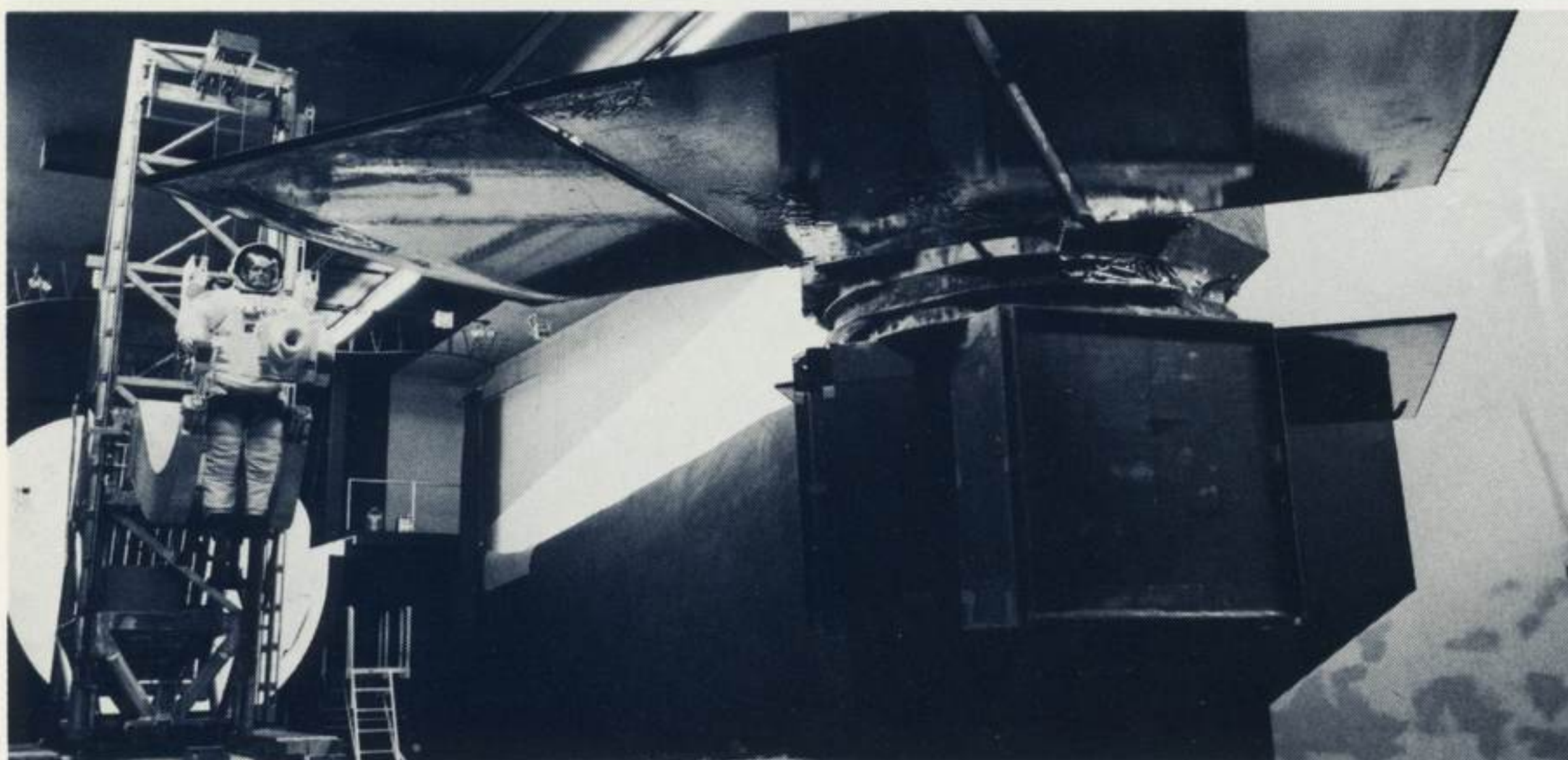
A contract award could come as early as February 1983 for the electronic data processing equipment selection and software development for the Space Defense Operations Center (SPADOC).

Proposal for Block A of SPADOC—the EDP equipment and software—was submitted earlier this month. The proposal is the culmination of almost five years work that included, among other efforts, a one-year definition contract that is just ending.

Wayne Faber is the program director and proposal manager. B. Clovis Landry is the technical director.

SPADOC will provide the Air Defense Command with an improved centralized operations center to integrate functions of space surveillance and attack warning, satellite survivability, and antisatellite weapons systems.

During the definition contract, Denver Aerospace was responsible for defining systems requirements, to plan a flexible incremental approach for the development, to prepare and evaluate a design for each increment, and to estimate the benefits and risks of the results.



Astronaut Bruce McCandless checks out a new trunnion pin attachment device in a "flight" in the space operations simulator to link up with a spinning full-scale mockup of the solar maximum mission satellite. The manned maneuvering unit will be used to stabilize the spinning satellite before it is brought into the Space Shuttle's cargo bay for repair on STS-13. The simulator has flight characteristics like the MMU.

# Tethered satellite contract won

The first part of a two phase contract for advanced development of a tethered satellite system has been awarded to Denver Aerospace by NASA. Estimated value of the one-year first phase of the contract is \$1 million.

"We had real tough competition for this contract," says Donald S. Crouch, project manager for the tethered satellite system contract.

"When there were some gaps in NASA funding Martin Marietta allowed me to use independent research and development funding to keep our work on tethered satellite rolling. This was contributory to us winning the contract."

The company will design the equipment necessary to deploy and retrieve a satellite from the cargo bay of the orbiting Space Shuttle.

The satellite, tethered to the Shuttle by a line as much as 60 miles long, could explore the 60-90 mile region of upper atmosphere and provide previously unobtainable data for petroleum and mineral exploration and other earth resources.

The system may also aid in earthquake prediction, make possible high resolution photographs of the Earth's surface, and permit atmospheric studies of man-generated pollution and ozone depletion, as well as space plasma investigations.

Crouch joined Martin Marietta in 1953 working on the Vanguard program. After several years spent in Europe as a field engineer working on the Mace-Matador missile system, he became project manager for the lunar drill used on Apollo missions 15 through 17.

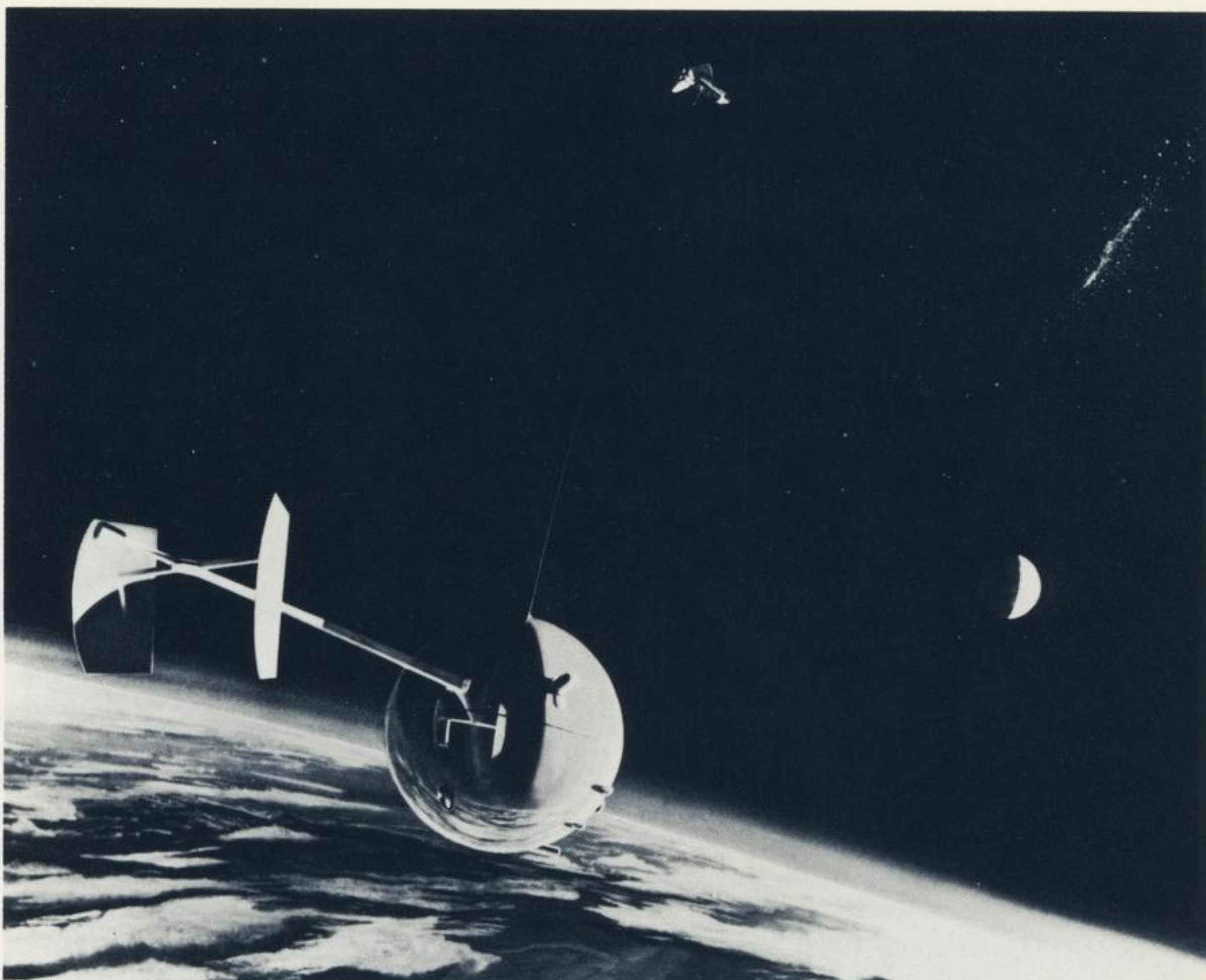
He was project manager for surface sampling system used on Viking before becoming program manager for tethered satellite.

Work on the tethered satellite contract begins in December and continues through 1983. The second phase, the design and fabrication of flight hardware, is tentatively planned by NASA to begin in January, 1984. The first demonstration flight is scheduled for 1987.

## Baltimore gets two production contracts

Baltimore Aerospace has received production contracts valued at \$350 million, including \$253 million in Navy contracts for the vertical launching system scheduled to be installed aboard Ticonderoga-class cruisers and Spruance-class destroyers starting in 1985.

Under another major contract, Baltimore will build vertical and horizontal stabilizers and flight-control vanes for the Air Force's new B-1B bomber. The purchase price of the structures for the first 18 aircraft will be \$97.2 million.



*A tethered satellite gathers data about the upper atmosphere before being retrieved by the Space Shuttle in this artist's concept. Denver Aerospace will develop the satellite system and hardware for NASA. The government of Italy will design and build the satellite itself.*

## 'Electronic mail' test is progressing well

Electronic transmission of documents—electronic mail—is increasing as a pilot program that began in April continues.

The goal of the network, according to Raymond S. Wiltshire, one of the program's advisers, is to reduce interoffice mail delivery time from days to hours.

The pilot program was begun under the direction of the Aerospace Executive Users Group (AEUG). Gerald Simonson, the AEUG representative to the Denver project team, described the project as "involving the design, test, and implementation of a system to transfer text over telephone lines between various computers and word processors."

While the original intent of the system was to improve communications between Aerospace headquarters and the various Aerospace company locations, an important by-product has been the communication established among Denver locations.

On the Denver network are Eng. 112; SSB 412; facilities and services in the inventory building; DSC II 169; RDL (basement); and several locations in Greenwood Commons.

Outside Denver, service is to both Corporate and Aerospace headquarters in Bethesda; Orlando Aerospace; Michoud division, Canaveral operations; Kennedy Space Center; Houston Space Center; offices in Sunnyvale, El Segundo, and San Bernardino, California; and Vandenberg Air Force Base.

The system has demonstrated its ability to exchange information electronically, using a variety of hardware, in much less time than

by ordinary mail. In most cases, transmittal is completed in less than an hour.

"About one-third of the more than 300 Wang work stations have communications capability," said G.B. Macaulay, manager of publications and project team members. "Wang is an integral part of the network."

Other systems in the network include equipment by IBM, Digital Equipment, and Lanier, as well as dial-up terminals.

"The project is a good example of effective teamwork," said G. Max McGarr, director of Denver Data Systems and project team adviser. The team included people from Data Systems and Aerospace locations in Denver, Orlando, Baltimore, and Bethesda.

"Development of the system also was quite an accomplishment technically because of all the different types of equipment involved," McGarr added.

Those with access to terminals and a need to transmit documents electronically may call Polly Speranza, Ext. 4790, or Paula Curra, Ext. 6991, for information.

## Thanksgiving meal is November 23

Sixty turkeys will be roasted for the annual Thanksgiving meal served in the cafeteria this year November 23.

Mashed potatoes, dressing, pumpkin pie, and assorted vegetables will round out the menu.

## MX preparations continue at Vandenberg

Work is proceeding on schedule at Vandenberg Air Force Base, California for the first MX missile test launch in early 1983.

Martin Marietta responsibilities include installation of equipment, checkout of facilities, and assembly and flight testing of the MX mission at Vandenberg.

This includes the design and building of missile handling and transportation equipment.

A key element in the handling procedure is the canister rotation and missile assembly fixture (CRMAF) now undergoing testing. Located in the missile assembly building, the CRMAF is used to rotate the missile canister from a horizontal to a vertical position for loading missile stages.

The testing involves a full weight simulated missile. A 65-foot elevator piston assembly lowers stages as they are mated. After assembly, the missile system will be moved to the test pad by a specially designed 80 wheel canister transporter, also currently undergoing testing. Following attachment of the canister/missile assembly to the launch support stand, the transporter will be lowered and driven away.

Prior to launch, the canister is hydraulically raised to a near vertical position.

## Employees move to Littleton facility

First employees to occupy the Littleton System Center moved into the facility this week.

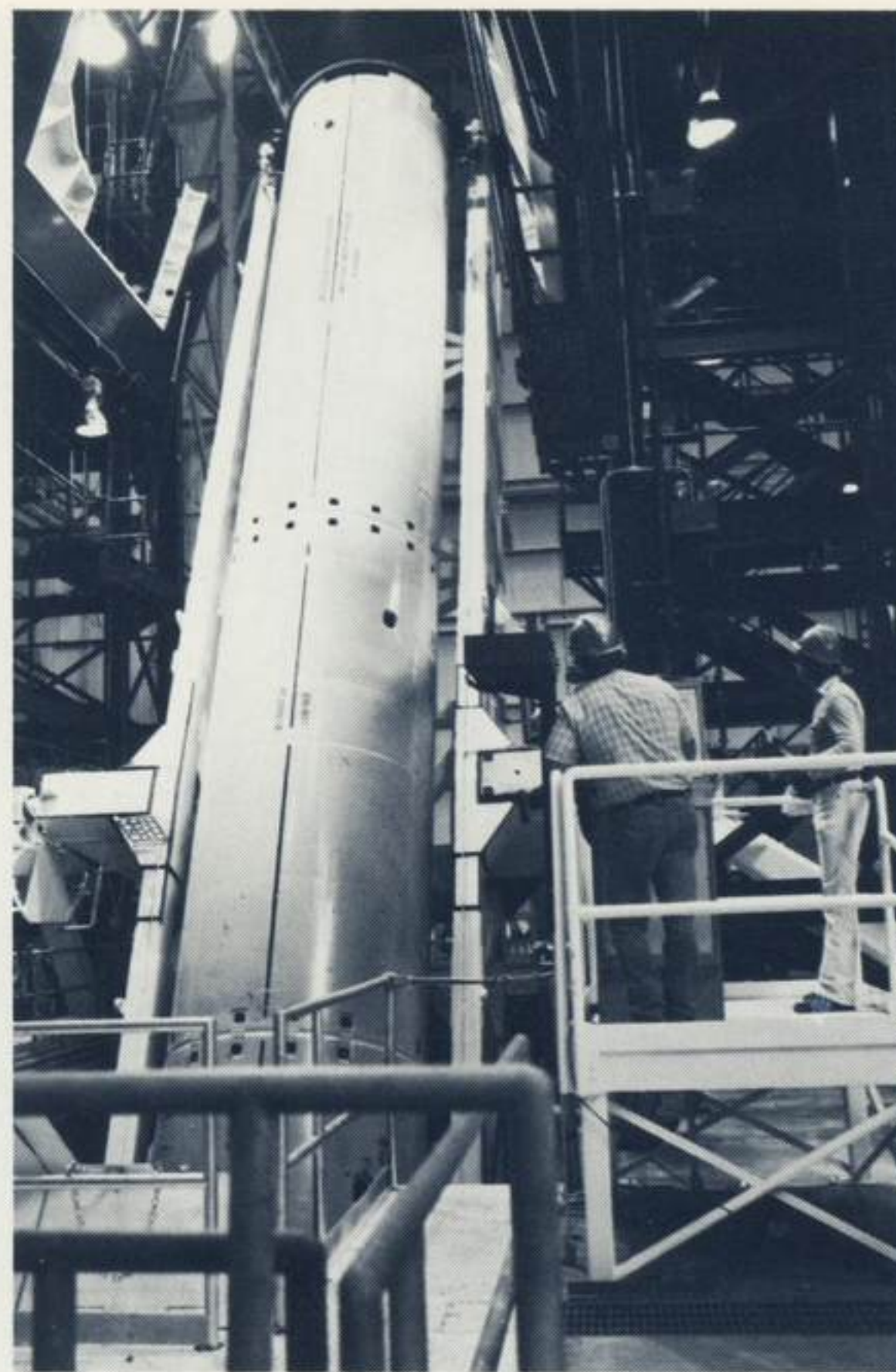
The moves will continue until mid-December. About 500 employees will move this year.

Organizations moving into the center include materiel, finance, and a portion of space and electronics systems division.

In January, part of the command and information systems group will occupy the building.



Employees began to occupy the Littleton Systems Center this week. About 500 employees from materiel, finance, and space and electronics systems division are scheduled to occupy the facility by the end of December. In January, part of the command and information systems group will occupy the building.



The canister rotation missile assembly fixture (CRMAF) is tested by Martin Marietta engineers at Vandenberg Air Force Base. Located in the missile assembly building, the CRMAF rotates the missile canister from the horizontal to vertical for loading missile stages.

## Orlando gets contract for seeker production

Orlando Aerospace has received a \$27.7-million U.S. Army contract for first-year production of laser-seekers for Hellfire missiles, the primary weapons carried aboard AH-64A Apache helicopters.

Orlando also produces the helicopter's nose-mounted TADS/PNVS fire control and navigation system which, among other tasks, detects, identifies, and designates targets for the Hellfire missile.

## Air Force 34D launch achieves objectives

Lt. Gen. Richard C. Henry, Commander, Air Force Systems Command Space Division applauded the success of Titan 34D and the interim upper stage (IUS) after the launch on October 30.

"The launch team achieved all objectives and the payload satellites are now on orbit. This has been a significant achievement for hundreds of men and women on the Air Force and contractor team. I congratulate them all.

Launched on time and according to plan, the new space vehicle placed the interim upper stage and two military communications satellites into orbit. The IUS later boosted the satellites to a 22,000 mile orbit.

## SLS employee of year visits launch site

Among those at the launch of the first T34D IUS vehicle October 30 was Space Launch System's production employee of the year, Paul P. Ritz of major weld and final assembly.

Also touring the launch site in honor of their contributions to the launch were Lyle Wellnitz and Mary E. Loy, Titan wire line fabrication, and quality source representatives Charles Butman, James Ignagni, and Michael Nasso.

Representatives from hardware suppliers to the Titan program honored as special guests were Arthur Moore, Stainless Steel Products; Paul Beach and James Hammons, Gulton Industries; Mark Windham, Nytronics; and Jeffrey Jerpbak and Jack McHale, Jerpbak-Bayless.

## Study to evaluate Space Shuttle impact

The external tank operations at Kennedy Space Center has been awarded a \$125,000, one-year contract by NASA at KCS.

The purpose of the advanced space transportation system ground operations study is to evaluate the impact of advanced Space Shuttle vehicles on the Kennedy Space Center and Vandenberg Air Force Base Launch sites.

The four advanced Shuttle vehicle concepts involved in the study are the aft cargo carrier, shuttle derived cargo vehicle, shuttle derived cargo launch vehicle, and solid rocket booster-X.

The study is expected to begin in late 1982.

## Holiday plant closings set

Company facilities will be closed November 25 and 26 in observance of Thanksgiving.

Facilities will be also closed December 24 and December 27-31 for the Christmas and New Year's holidays.

## Publications awards entry deadline set

The publications awards committee has set January 5, 1983, as the entry deadline for the Denver Aerospace awards program.

Eligible papers should be submitted in 10 legible copies and be accompanied by a publications award entry form and a publications clearance form. Forms and information on the program may be obtained from R.V. Walker, organization and management development, Eng. 225, Ext. 3395, Mail No. 1318.

To be eligible for an award, an article must have been published between January 1 and December 31, 1982. Proof of publication is required by the awards committee and should be furnished by the authors.

Signed articles appearing in professional, technical, or trade periodicals, journals, books, papers, or bound proceedings may be submitted. Only those publications related to the author's professional function and assigned duties are acceptable.

Entries will be evaluated on the basis of creativity, technical content, benefit to company, mode of expression, and quality of publication.

## New MARCALL access code in effect tomorrow

New six-digit MARCALL authorization numbers go into use tomorrow, November 20.

A revised MARCALL user's guide detailing use of the authorization numbers has been issued through business managers or department administrators.

Approved authorization numbers, keyed to employee badge numbers, have been entered in the MARCALL computer base.

The new numbers are required for all calls placed through MARCALL.

## Weekend college is offered women at DU

Working women who cannot attend evening college classes may now work towards a degree on weekends.

The University of Denver is offering a bachelor's degree program in business with classes meeting Friday evening, Saturday morning and afternoon, and Sunday morning. Sessions are scheduled on seven alternate weekends each quarter. Each class meets for three and one-half hours each weekend.

The winter quarter begins January 7, 1983. Classes meet on the Colorado Women's College campus, Montview Blvd. and Quebec St.

A weekend college representative will meet with prospective students here as interest warrants.

Call Bette Wooster, Ext. 5698, for additional information.



Colorado State University's Corporate Enterprise Achievement Award is accepted for Martin Marietta by James W. McAnally, vice president, technical operations, right. The award recognizes the company's grant of \$250,000 to develop a computer-assisted engineering center at the University. Presenting the award is Dr. Lionel V. Baldwin, dean of CSU's engineering school.

## United Way refers needy to 2,000 agencies

Most persons at one time or another need information or help in resolving a problem. The Mile High United Way Information and Referral Service links people in need with available community service.

The Service helps persons define their problem and service needs, and refers them to the appropriate non-profit agencies in the Denver Metro area.

The Service maintains information on more than 2,000 agencies and programs, plus 1,500 licensed child care facilities.

Referrals are offered to services addressing a wide variety of human needs, including per-

sonal or family counseling, health programs, alcohol or drug counseling, recreational programs, services for the elderly, and legal services.

This free and confidential service is the community's only comprehensive source on available human services. It is a starting point for people in need, and it offers help in identifying alternatives and understanding how to deal with the "red tape" that sometimes accompanies seeking aid.

To contact the Mile High United Way Information and Referral Service, call 837-9999 between 8 a.m. and 5 p.m., Monday through Friday.

## 'United Approach' started in Denver 95 years ago

Denver was the first community in the nation to conduct a United Way campaign. Since 1887, the United Way method of giving has spread to 2,200 communities throughout the United States, Canada, South Africa, the Philippines, Australia, Japan, and Korea.

A Roman Catholic priest, two Protestant ministers, and a rabbi formed the Charity Organization of Denver to raise funds jointly, prevent duplication of services, and develop cooperation among 23 participating agencies.

The first year, \$21,700 was pledged; all but \$61 was collected.

There has been a United campaign every year since that date. Several of the original agencies still serve the community.

In 1981, the Mile High United raised \$16,032,000, a 17.4 percent increase in giving over 1980 figures. This was the second largest increase by any major U.S. city for the year. The goal for 1982 is \$18,600,000.



Holding checks received for their cost reduction efforts on the Titan II CLS contract are Duane Norris, test operations, and Daniel Magnum and Raymond Burns, quality. John P. Murphy, right, presented the awards for savings of more than \$6,800 on the present contract.

## Calendar traces history of musical instruments

The first crude whistle, a modern electronic synthesizer, and most of the instruments in between are pictorially featured in the 1983 Martin Marietta calendar.

The calendars will be mailed to all employees later this month.

As the calendar's introductory remarks report, "the first sounds heralding the dawn of musical history were created countless ages ago by prehistoric man.

"The clacks and screeches of the noise-makers these primitives made to drive away evil spirits and illness are far removed from the silky sounds produced by the modern violin...

"The beauty of musical instruments to the eye and to the ear is testimony that they are the most ingenious of man's inventions."

## Steam trap repair program proposed to save energy

An energy conservation program aimed at cutting losses from the company steam lines has been proposed for 1983.

Miles of steam lines wind through the plant. More than 1,000 steam traps—devices which collect condensate in the lines and return it to the boilers—are positioned throughout the system. Malfunction of steam traps releases steam to the atmosphere, wasting energy dollars.

A recent survey of existing equipment revealed a 20 percent failure of steam traps. Repair and replacement of the steam lines and traps has been proposed in the 1983 budget. Estimated savings achieved by the program and by insulating the steam lines is nearly \$500,000.

## Computer discount offered employees

Home or personal computers may now be purchased at discount through special arrangement by the company. Prices on selected computer hardware are discounted from six to 14 percent at Computerland stores in California and Colorado.

Interested employees can review the contract terms and conditions applicable to computer purchases in the recreation department.

## Recreation

**Bowling**—The Master's bowling tournament to be held December 4 and 5 at Celebrity Bowl is open to all employees of Denver Aerospace and Data Systems, and to Armed Services personnel assigned here. Entry forms, located in all recreation racks, are due to recreation with a \$10 entry fee by noon, November 22.

**Ski Lodging**—Special discount rates for lodging at Breckenridge, Copper Mountain, Keystone, Arapahoe Basin, and Vail are available for more than 250 condominiums, homes, and townhomes. Registration forms are available in all recreation racks.

**Melodrama**—Employee discounts are available for the Heritage Square Opera House performance of "Sweeney Todd the Barber." Call recreation, Ext. 6750 for details.

**Soccer**—The Martin United soccer team were victors in the B division of the Fall Colorado Masters Soccer League, defeating the Lakewood Nomads 4-1. The Martin United team finished the season with a 7-1 record.

## Construction, weather increase speeding risks

Adherence to posted 25 mile per hour speed limits is particularly important when construction projects restrict normal traffic flow on company roads.

Pedestrians picking their way among construction vehicles, barricades, and broken pavement may not be aware of approaching vehicles.

And the likelihood of slippery streets during bad weather also means "slow down." Loose gravel used on Colorado 75 and company roads to increase traction on ice and snow may be overlooked on dry pavement.

Drivers are reminded to observe posted speed limits and exercise caution in construction areas and when the roadways are slick.

## Credit Union offers services

In addition to savings programs and financial assistance from its current assets of \$2.3 million, the Red Rocks Credit Union offers its 4400 members special benefits.

Notary public services are available free of charge to members.

Two half-hour sessions of free legal counseling and reduced rates for continuing counseling are offered.

Travelers checks from Citicorp are sold to members with no service charge.

The NADA official used car guide is available for use in the credit union office.

Payroll deduction plans for loan repayment and savings are available.

For information on these and other credit union services, call Red Rocks Federal Credit Union, Ext. 6000.

## JA Company products displayed, sold here

Three company-sponsored Junior Achievement companies will sell their products at company facilities during the next three weeks.

Products will be sold November 19 in the DSC lobby, and December 3 in the engineering building first floor cafeteria and SSB lobby.

Wall hangings with bulletin boards and prepared shopping lists have been produced by "Corkboard Connections;" tow straps, trouble lights, and reflective triangles are products of the "J.A. Widgets;" and Aspenwood candles are for sale by "Denver Industries," sponsored by Data Systems.

### MARTIN MARIETTA NEWS

Published by Public Relations

MARTIN MARIETTA AEROSPACE

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November 19, 1982