

MARTIN MARIETTA

# news

DENVER DIVISION

NUMBER 2/1980

Astronaut  
checks MMU





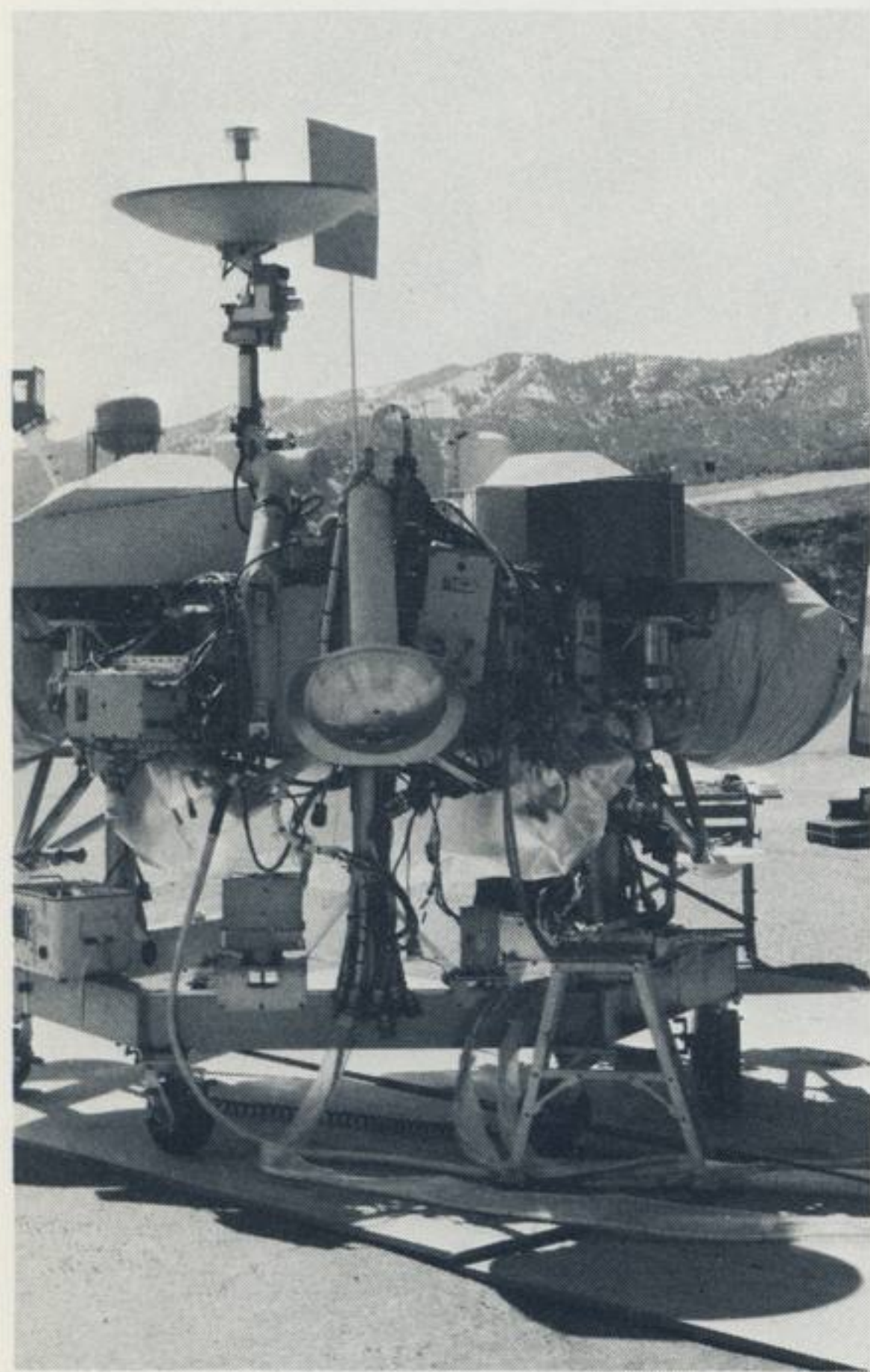
# Viking is honored by Smithsonian

The Viking mission to Mars has been called a "notable historical achievement in the annals of space flight" by the Smithsonian Institution and was commemorated February 6 when a duplicate of the Viking lander was put on permanent display in Washington, DC.

On display is the proof test capsule used by the lander support office in the division's general-purpose laboratory during early stages of the Viking mission. The proof test capsule and the Viking controls mockup were used to verify commands before they were sent to the spacecraft on Mars; to define both software and hardware problems; and to test and prove solutions to those problems.

The lander duplicate has been installed in the Milestones in Flight Hall of the National Air and Space Museum at the Smithsonian.

Speaking at the ceremonies were Dr. Robert A. Frosch, administrator of the National Aeronautics and Space Administration; L. J. Adams, president of Martin Marietta Aerospace; and Dr. Noel Hinners, director of the Smithsonian Institution's Air and Space Museum.



The Viking lander proof test capsule on permanent display at the Smithsonian was once at the division. It is shown here when it was moved outside so flight cameras could be calibrated in natural sunlight. Cameras were calibrated for color and stereo pairs by using targets as well as wide angle shots of the hills above GPL.



Representatives of Kuwait Airways inspected MARTRON equipment and facilities during a recent visit. In the photo are, left to right, Hamed Khajah, manager of electronics and instruments for the airline; George B. Breen, director of MARTRON systems; Harry Powell, superintendent of electronics and instruments for Kuwait Airways; and James W. Ninmer, manager of ATLAS programs for MARTRON. The equipment in the photo is a system scheduled for delivery to Jugoslovenski Aerotransport.

## MARTRON adds new customers

MARTRON sales in 1979 brought the total of commercial air line users to 20. The equipment also is used by the U.S. Air Force and the U.S. Navy. MARTRON is the division's line of automatic test equipment for avionics systems.

New customers in 1979 included Braniff International, Jugoslovenski Aerotransport (JAT), and the Hong Kong Aircraft Engineering Co., Ltd. (HAECO).

In addition to the major systems sales, more than 350 purchase orders from current customers were received for spare parts, computer programs, and various other services.

The division's product line includes the MARTRON® 1200, the MARTRON® 12000, and inertial guidance test unit, a unit for manometrics (air data computer) testing, and a library of more than 200 ATLAS (abbreviated test language for avionics systems) test programs.

George B. Breen, director of MARTRON ATE systems, said, "A visitor to our facility, I believe, would have two quick impressions: one, the high level of diverse activity and, second, the decided international flavor of the activity."

The international flavor would have been apparent recently with visitors from Kuwait and Yugoslavia present. Those from Kuwait are potential customers; the representatives from Yugoslavia are here for training and for system acceptance of their equipment.

Other near-term potential customers are Mexicana air lines and Qantas.

The division will be competing for their orders along with orders for equipment sales to several other air lines.

"Perhaps the most significant accomplishment in 1979 was development of a new minicomputer for use in MARTRON," said Breen. "The task was to build a minicomputer that is interchangeable with the present computer and one that also could be expanded to accommodate the complex instructions required for future digital avionics testing."

Satish K. Anand was in charge of minicomputer development.

"We are looking forward to a good year in 1980," Breen said, "and believe we will be as successful as we were in 1979."

### On the cover

Astronaut David Griggs tests the fit of a backpack maneuvering unit. The division is building two of the backpacks for use by Space Shuttle astronauts beginning late this year. Griggs was in Denver to help engineers evaluate certain aspects of the backpack's design. Griggs is being assisted by Martin Marietta crew systems engineer Joseph A. Lenda, left, and fellow astronaut Bruce McCandless.



## New technology awards announced

Seven employees have been named by the division's new technology evaluation committee to receive cash awards for their new technology disclosures submitted as a result of work on NASA contracts.

Award winners are:

Patrick C. Carroll, engineering mechanics, and Charles E. French, systems engineering: Planetary lander/floater probe concept.

Norman M. Phillips, systems engineering: Surface sample acquisition instrument.

Angelo J. Castro, systems engineering: Connectorless electrical interfaces.

Bob H. Cash, electronics: Flatpack clip.

Frank I. Tallentire, systems engineering, and Martin J. Costello, electronics: Heavy duty hand-held hot knife for cutting and sealing large cross section parachute materials.

Information on submission of new technology disclosures under NASA contracts may be obtained by calling extension 3208 or 5423.

### Holidays set for 1980, early 1981

Twelve paid holidays have been announced for division employees for 1980 and early 1981.

One holiday, New Year's Day, has been observed for 1980.

Upcoming holidays are:

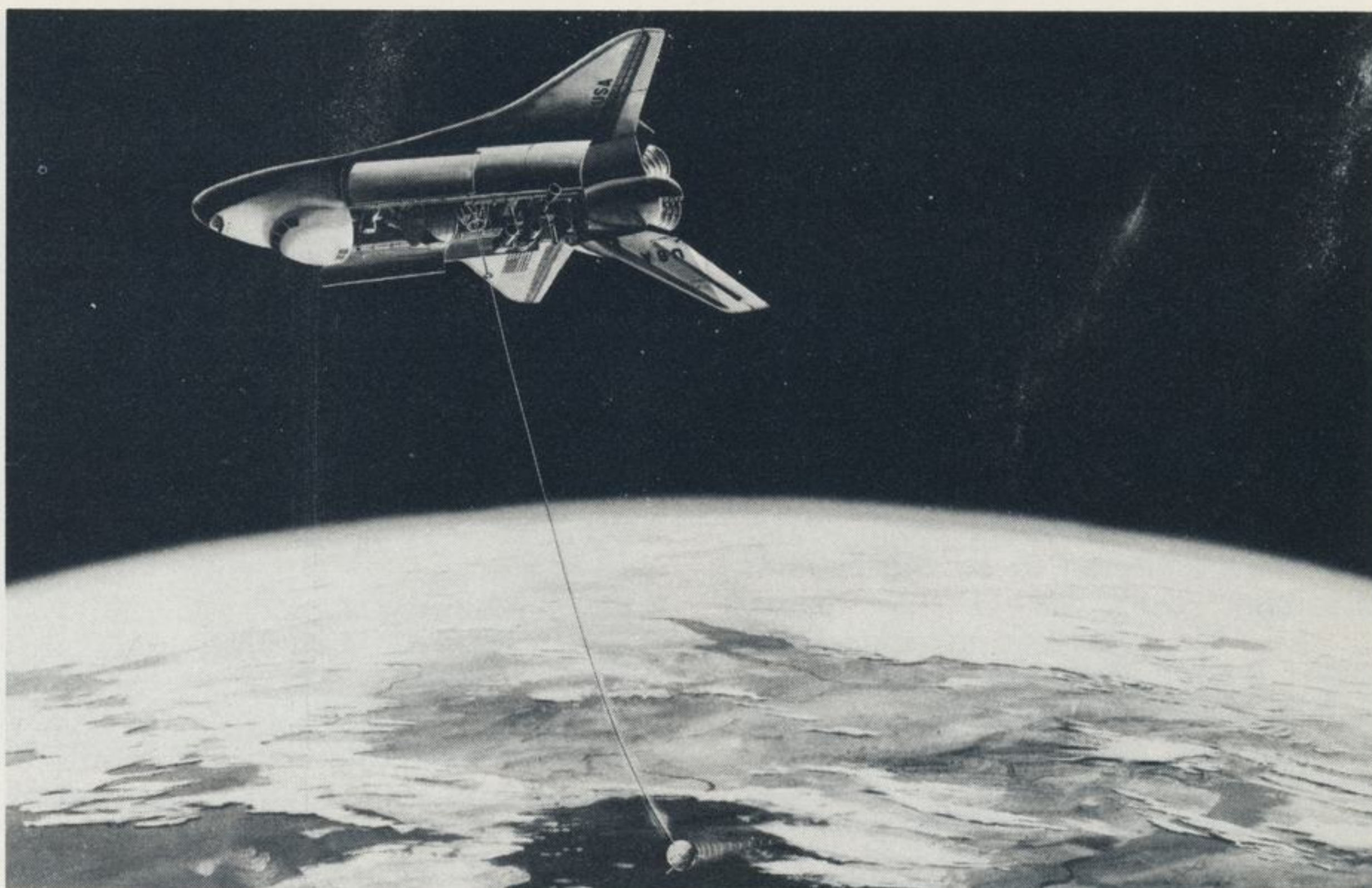
*Good Friday:* Friday, April 4.

*Memorial Day:* Monday, May 26.

*Independence Day:* Friday, July 4.

*Labor Day:* Monday, September 1.

*Christmas/New Year's:* Thursday, December 25 through, and including, Friday, January 2, 1981. (A total of seven working days.)



The Space Shuttle tethered satellite system is shown in this artist's concept deployed in low-Earth orbit from Shuttle orbiter. The system permits a variety of long-duration observations and scientific measurements 60 to 90 miles above the Earth.

## Tethered satellite study is nearing completion

Work on the phase B concept definition contract for the Shuttle/tethered satellite system is nearing completion in the division.

The study, under contract with the NASA Marshall Space Flight Center, includes the performance of satellite and Shuttle-mounted equipment configuration definition, planning and cost estimating for the first verification flight, satellite configuration definition for several scientific missions beyond the first verification flight, and supporting engineering analyses.

A request for proposal for the design phase and first mission flight hardware option is expected about May 1.

First mission for the tethered satellite is expected in early 1984.

Most applications currently envision deploying a payload to a low-Earth orbit from Space Shuttle at about 120 miles. The system permits the satellite to perform a variety of long-duration observations and scientific measurements in orbits of 60 to 90 miles. These altitudes are beyond the range of winged aircraft and balloons; rocket-launched satellites placed in these low orbits have short lives; and sounding rockets have even shorter times in which to conduct observations or experiments in the 60 to 90 mile belt.

In operation, the satellite is moved a safe distance from Shuttle orbiter by an extendable boom. When in posi-

tion, the satellite, attached by a flexible metallic or synthetic line, is released. By a combination of velocity, gravity, and atmospheric drag, the satellite is deployed in an orbit different than that of Shuttle.

Because it remains tethered to the Shuttle orbiter, the satellite can be placed in new orbits, retrieved, refurbished, and reconfigured for subsequent missions.

The tethered satellite system, although being designed to put payloads in orbits lower than Shuttle, also can put payloads in orbits higher than Shuttle.

The system will occupy about 20 percent of the Shuttle orbiter cargo bay and can share the space with numerous other scientific investigation equipment, including the Spacelab module.

It is expected that several tethered satellites will be designed, each for specific scientific investigations. Up to four tethered satellite missions a year could be accommodated throughout the Shuttle's life span.

### MARTIN MARIETTA NEWS

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Denver Division  
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February 1980



# 1979 a year of change, growth for development

In many respects, 1979 represented a year of change and increased participation in company-sponsored education, training, and personnel development programs.

During the year, 335 employees took advantage of the tuition reimbursement program. A new aspect of this program is the graduate degree program in aerospace engineering taught at the division by the University of Colorado.

The continuing education evening program again showed its popularity by attracting more than 900 participants during the year.

A group of approximately 30 maintenance personnel took part in the skills improvement and familiarization course started in 1979.

The area of greatest impact was in the individual development courses. Short courses and seminars, which were primarily technical, attracted more than 300 participants.

A new course that has had a significant impact on employees is one of learning to manage stress in one's life. More than 60 employees have reported significant changes after taking the course.

A new course for management personnel on coaching and counseling

employees has been called "down-to-earth and practical" by the more than 180 who have taken it. More than 250 have signed up for the course in 1980.

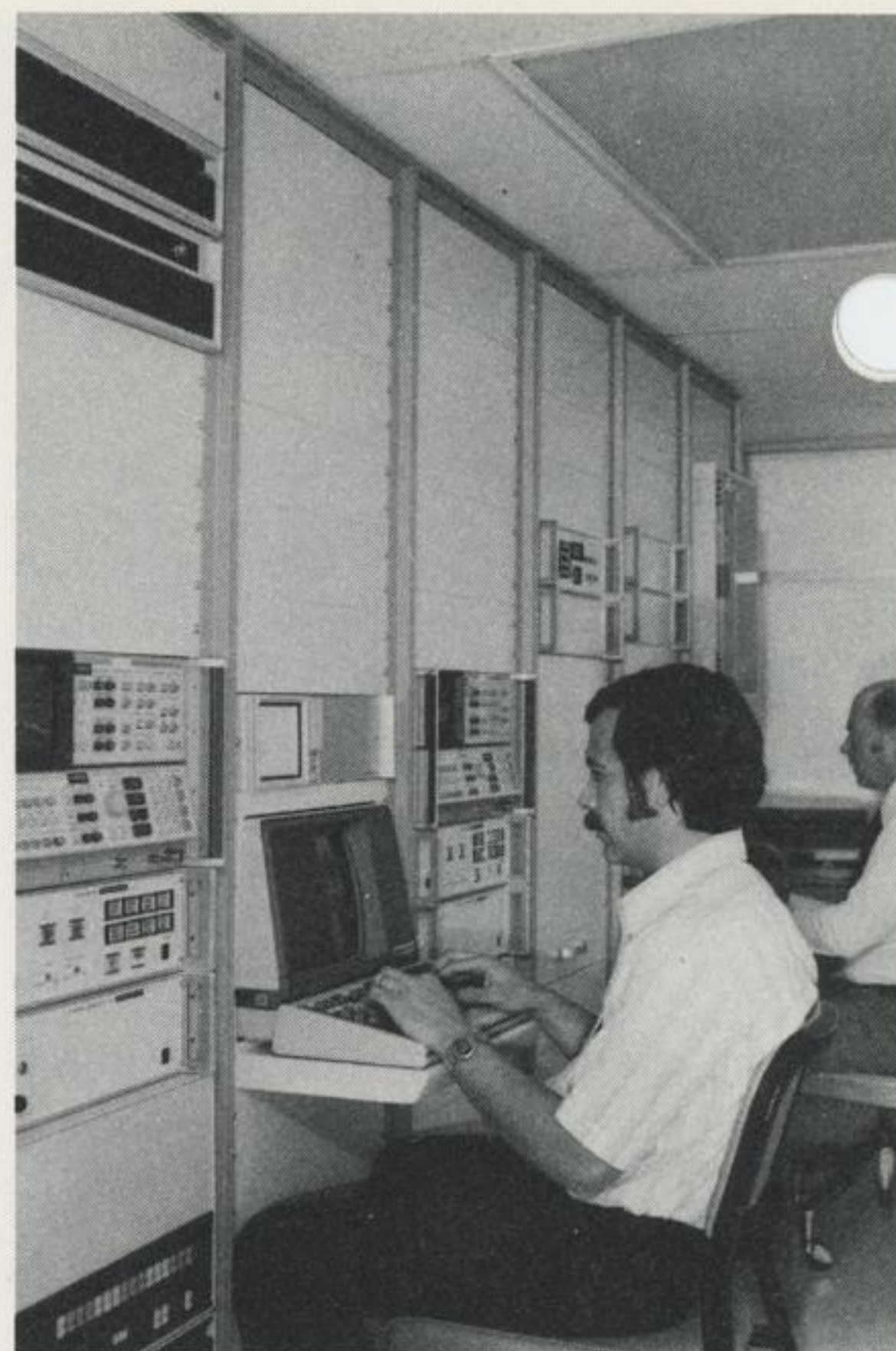
Perhaps the most demanded course offered is the two-day managing personal growth workshop. More than 600 employees participated in the workshop with 94 percent reporting it was "worthwhile" and 25 percent reporting major changes in their careers as a result of the workshop.

## Division to bid on countermeasures evaluation units

The division will soon be submitting a proposal to produce an automatic signal analysis system that will evaluate the operational readiness of electronic countermeasures equipment and operators of such equipment onboard U.S. Air Force aircraft.

The request for proposal is being issued by the U.S. Air Force Armament Division at Eglin Air Force Base, FL, and is expected to be for six of the systems.

The division has developed a system simulating ground-based threats and airborne electronics counter-



Thomas A. Milheiser, left, electronic design lead, and Glick U. Bishop, right, manager of electronic warfare systems, sit at the control and analysis operator positions of the signal analysis unit.

measures. The division's system evaluates the operational readiness of man-operated and automatic countermeasures on the aircraft. It monitors the training exercise records the results, evaluates the airborne equipment and personnel, and prepares reports.

## Shuttle bus service serves division locations

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Shuttle bus service between the division's main facilities and offsite locations began February 1. Three 10-passenger vans are operating on routes serving the main plant, DSC, and West Point; main plant and the Greenwood area; and DSC, West Point, and the Greenwood area. Late in the day, one run will serve all areas.

The schedules:

### Late Shuttle Bus

	Arrive	Depart
Eng. lobby		4:05 pm
SSB lobby	4:10 pm	4:15 pm
DSC lobby	4:35 pm	4:40 pm
GP south door	5:15 pm	5:20 pm
GC bldg 6050	5:25 pm	5:30 pm
DSC lobby	6:05 pm	6:10 pm
Engineering/SSB lobby	6:30 pm	

### Engineering/SSB/DSC/West Point

	Arrive	Depart
Eng. lobby		8:15 am
SSB lobby	8:20 am	8:25 am
DSC lobby	8:45 am	8:50 am
WP south door	8:55 am	9:00 am
Eng. lobby	9:20 am	9:25 am
SSB lobby	9:30 am	9:35 am
DSC lobby	9:55 am	10:00 am
WP south door	10:05 am	10:15 am
Eng. lobby	10:35 am	10:40 am
SSB lobby	10:45 am	10:50 am
DSC lobby	11:10 am	11:15 am
WP south door	11:20 am	11:25 am
Eng. lobby	11:45 am	
Lunch and fuel		
Eng. lobby		12:30 pm
SSB lobby	12:35 pm	12:40 pm
DSC lobby	1:00 pm	1:05 pm
WP south door	1:10 pm	1:20 pm
Eng. lobby	1:40 pm	1:45 pm
SSB lobby	1:50 pm	1:55 pm
DSC lobby	2:15 pm	2:20 pm
WP south door	2:25 pm	2:30 pm
Eng. lobby	2:50 pm	2:55 pm
SSB lobby	3:00 pm	3:05 pm
DSC lobby	3:25 pm	3:30 pm
WP south door	3:35 pm	3:40 pm
Engineering/SSB lobby	4:00 pm	

### DSC/West Point/Greenwood

	Arrive	Depart
DSC lobby		8:15 am
WP south door	8:20 am	8:25 am
GP south door	8:55 am	9:00 am
GC bldg 6050	9:05 am	9:10 am
DSC lobby	9:40 am	9:45 am
WP south door	9:50 am	9:55 am
GP south door	10:25 am	10:30 am
GC bldg 6050	10:35 am	10:40 am
DSC lobby	11:10 am	11:15 am
WP south door	11:20 am	
Lunch and fuel		11:55 am
WP south door		12:30 pm
GP south door	12:25 pm	12:30 pm
GC bldg 6050	12:35 pm	12:40 pm
DSC lobby	1:10 pm	1:15 pm
WP south door	1:20 pm	1:15 pm
GP south door	1:55 pm	2:00 pm
GC bldg 6050	2:05 pm	2:10 pm
DSC lobby	2:40 pm	2:45 pm
WP south door	2:50 pm	2:55 pm
GP south door	3:25 pm	3:30 pm
GC bldg 6050	3:35 pm	3:40 pm
DSC lobby	4:10 pm	

### Engineering/SSB/Greenwood

	Arrive	Depart
Eng. lobby		8:15 am
SSB lobby	8:20 am	8:25 am
GP south door	8:55 am	9:00 am
GC bldg 6050	9:05 am	9:10 am
Eng. lobby	9:40 am	9:45 am
SSB lobby	9:50 am	9:55 am
GP south door	10:25 am	10:30 am
GC bldg 6050	10:35 am	10:40 am
Eng. lobby	11:10 am	11:15 am
SSB lobby	11:20 am	11:25 am
GP south door	11:55 am	12:00
GC bldg 6050	12:05 pm	12:10 pm
Eng. lobby	12:40 pm	
Lunch and fuel		
Eng. lobby		1:25 pm
SSB lobby	1:30 pm	1:35 pm
GP south door	2:05 pm	2:10 pm
GC bldg 6050	2:15 pm	2:20 pm
Eng. lobby	2:50 pm	2:55 pm
SSB lobby	3:00 pm	3:05 pm
GP south door	3:35 pm	3:40 pm
GC bldg 6050	3:45 pm	3:50 pm
Engineering/SSB lobby	4:20 pm	



## Credit union membership drive exceeds projection

The Red Rocks Credit Union board projected a membership of 500 during the first month of operation when it opened the membership campaign January 21. By the end of the first week, 566 employees had joined with deposits of more than \$20,000.

"The response was overwhelming," said Charles E. Richards, credit union manager. "We knew interest was high, but we did not anticipate the rush we had during the promotion week."

Memberships are being accepted from Denver Division and Data Systems employees and from retired employees. A person may become a member for as little as \$10.00—a one-time \$5.00 membership fee and a \$5.00 credit union share. Membership continues as long as a person keeps a \$5.00 share account, even though the member is no longer employed at the Denver Division or Data Systems.

Credit union offices are in engineering building 240, near the library in the former second floor cafeteria area. The office is open daily from 10:30 am to 1 pm. Mail number is CU-1; telephone extension is 6000.

Employees interested in membership may contact the office.

## Martin Marietta sales pass \$2 billion mark

Martin Marietta Corporation sales and earnings reached new record high marks in the fourth quarter of 1979 and for the full year.

Net earnings for 1979 were \$178,000,000 or \$7.10 per share, and sales reached \$2,060,843,000. Martin Marietta's previous high levels, all recorded in 1978, were \$136,003,000 of net earnings, or per \$5.54 per share, on sales volume of \$1,758,297,000. (Assuming full dilution, 1978 per share earnings were \$5.31; redemption—in the third quarter of 1978—of all outstanding convertible debentures removed the dilutive potential of the fourth quarter of 1978 and all of 1979.)

Fourth quarter 1979 sales rose to \$569,430,000 and net earnings were \$1.50 per share, or \$37,302,000. Comparable results for the 1978 fourth quarter were \$507,184,000 of sales and per share earnings of \$1.44 on net income of \$36,630,000.



Charles E. Richards, manager of the Red Rocks Federal Credit Union, discusses credit union services with Laurie Banerian. The office is near the library on the second floor of the engineering building.

## Reports due from former officers

Former employees of the Department of Defense, NASA, and certain former military officers required to report NASA and defense-related employment must do so by February 15. The report covers the federal fiscal year October 1, 1978 to September 30, 1979.

Forms and information for filing are available at:

**Denver:** D. N. Verrastro, module 125, engineering building.

**Cape Canaveral:** Richard A. Freeman, MRL building.

**Michoud:** Raymond J. LaCombe, column F3, first floor building 350.

**Vandenberg:** Donald N. Loats, room 72A, building 8401.

## Recreation

**Representatives named**—Discount tickets, bus tokens, and other recreation office material may be obtained from recently named recreation representatives. The representatives are: SSB—Sheralyn Fisher, module 500, ext 4433; DSC—Kay Shuey, module 200, ext 500; JoAnn Dummer, lobby Greenwood Commons building 6040, 741-3183; Federal Boulevard—Lucy Winda, module 107, ext 270. These items are also available at the recreation office, engineering building, module 125.

**Hockey tickets**—Three special Martin Marietta nights have been set for Colorado Rockies games, Sunday, February 10; Friday, February 22; and Sunday March 9. Coupons for the discount tickets are available at the recreation office, from recreation representatives, and in the display racks.

**Bridge club**—Efforts are under way to form a Martin Marietta bridge club. A meeting will be called to discuss the club formation, playing dates and times, and meeting places if enough interest is expressed. The club will be open to employees of the division and Data Systems and their immediate families. Beginner, intermediate, and expert players are invited. Prospective members should call Gordon G.

Duncan, ext 5976, or Kevin Hanson, ext 6750.

**Masters bowling tournament**—The top two bowlers in the recently completed Martin Marietta Masters bowling tournament are being sponsored in the Denver Masters tournament by the recreation office. Final eight in the tourney were Billy W. McFadden, 1640; Frank Penn, 1546; Bernard D. Winslow, 1532; Richard E. Watts, 1462; Harold C. Wisherd, 1441; John P. Coan, 1384; Floyd R. Teiffel Jr., 1311; Donald Makuch, 1310. High series was rolled by Thomas Cook—a 645. Robert A. Powell rolled a high game of 248.

**Volleyball leagues**—Two co-rec volleyball leagues and a U.S. Volleyball Association coed competition league are being formed for Spring play. Employees and immediate family members 18 and over and military personnel assigned at the division are eligible for teams. Co-rec leagues will play on Tuesday and Thursday nights. Entries will be accepted for the first 24 teams. Play will begin March 4 at Arthur Henry Junior High School, 3005 So. Golden Way. The USVBA coed competition league will play Thursday nights. Entries will be accepted for the first 12 teams to play power coed volleyball at Arapahoe Community College. Entry blanks are available from recreation.



# Michoud program manager holds flight record

Robert W. Smith can make a claim few others can match. In 1963 he nearly became a Gemini astronaut.

Smith, program manager for production readiness at Michoud, was one of nine Air Force finalists from whom four were selected to fly the Gemini mission.

Even though he did not fly on Gemini, Smith has blazed a few trails in flight and space travel. A former Air Force test pilot, he was listed in the Guinness Book of Records for the highest altitude ever reached in an airplane. During flight tests from 1963-77 he flew higher than 120 thousand feet (22.5 miles).

His record flights were made in an NF-104 Starfighter rocket/jet airplane at Edwards Air Force Base to test reaction control systems and to determine high speed reentry reactions and sustained zero-g flight. The cockpit contained nitrogen and atmospherically controlled flight suits were required.

Smith flew more than 200 missions in Korea and Viet Nam. He earned the Air Force Cross, the second highest

award for valor, the Silver Star, the Distinguished Flying Cross four times, and 15 Air Medals.

He had a fantasy come true when he flew with the Air Force Thunderbirds. "I was always amazed by formation aerobatics and one of the highlights of my life was flying with the Thunderbirds," Smith said.

Smith was chosen for the aerobatic team, but a general vetoed the orders because he felt Smith's education would be wasted. "However," he beamed, "I did fly one formation with them, and I'll never forget it."

An aeronautical engineering student at the University of California, Smith later graduated from the Air Force Institute of Technology in Dayton, Ohio. He completed test pilot and aerospace research pilot schools at Edwards Air Force Base.

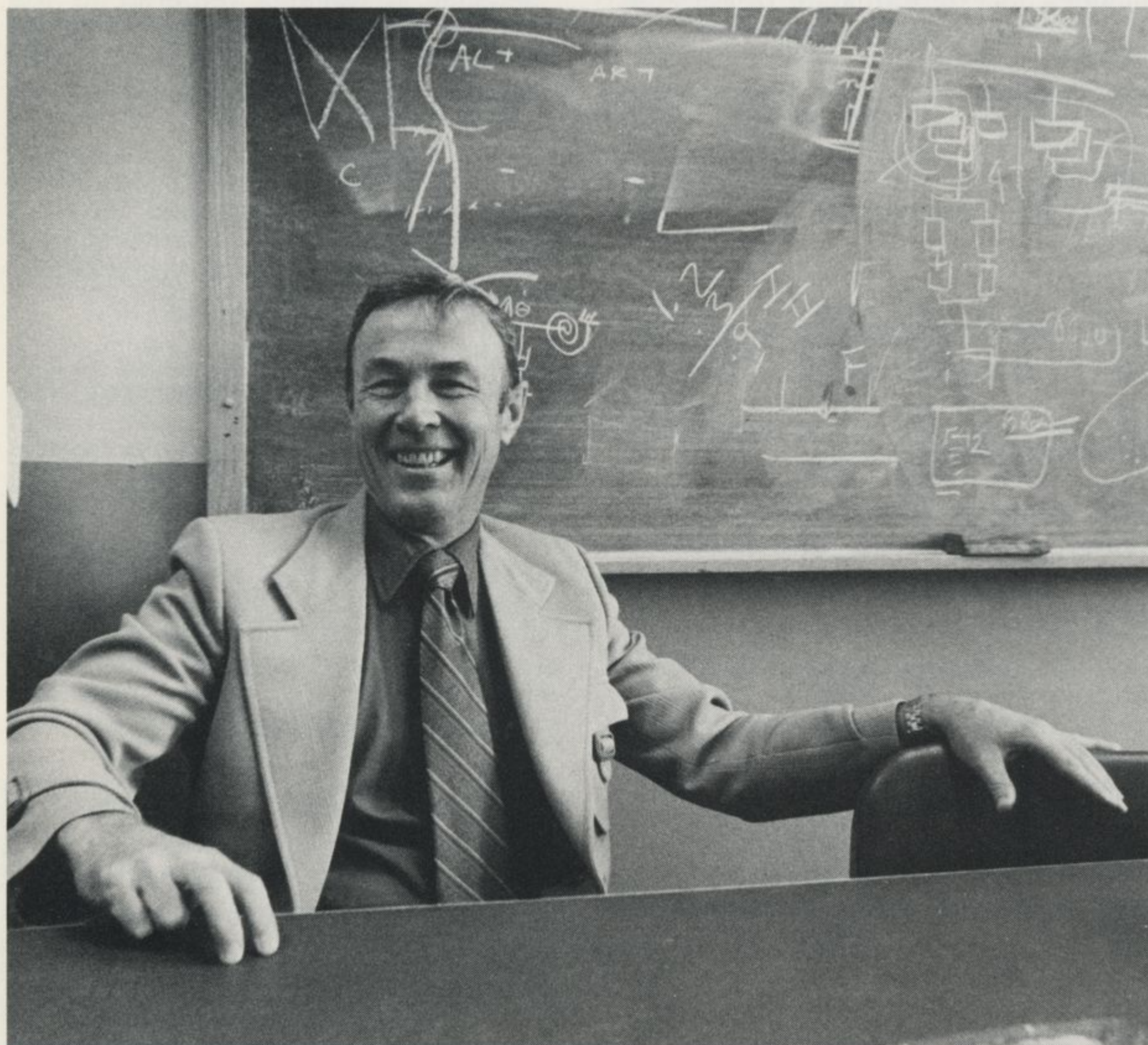
Smith has served at Air Force Systems Command headquarters and at the Pentagon.

He joined Martin Marietta in 1969 as integration manager for earth

resources experiments in Denver. He moved to Michoud six years ago. He has received the Martin Marietta Corporation Jefferson Cup and three division awards for his performance in his 10 years with the company.

Asked about his most memorable experience, Smith is quick to recall his role as a combat squadron leader in Viet Nam. Then he added, "The only thing I regret is not having been on the first space flight to land on the moon."

At least he has the satisfaction of knowing he was a lot closer than most.



Robert W. Smith is program manager for production readiness.



Smith flew rocket-equipped NF-104 Starfighter to altitude record above Mojave Desert.