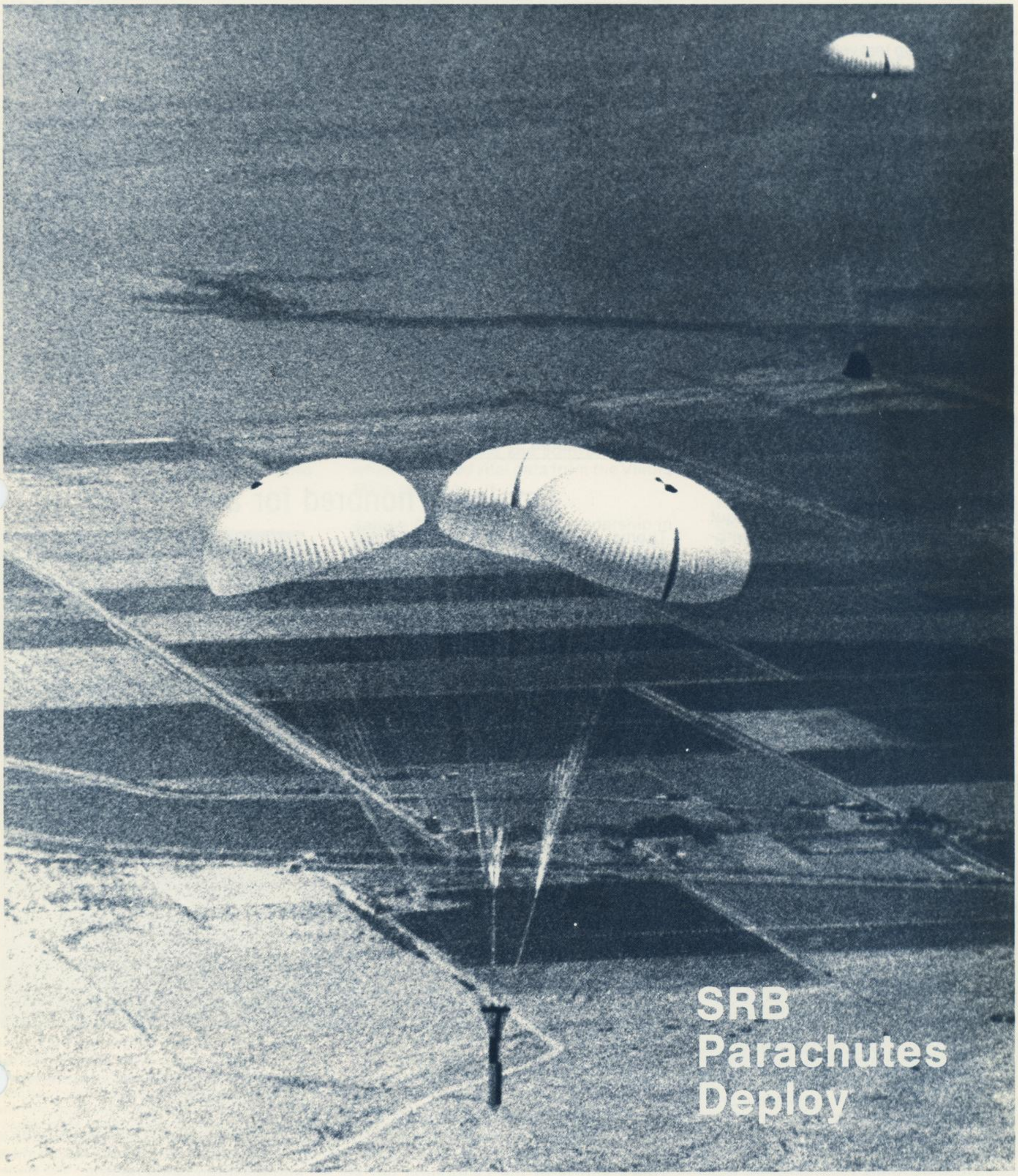
MARTIN MARIETTA
news
DENVER DIVISION

NUMBER 10/1977



Solid rocket booster recovery system tested

The first test of the space shuttle solid rocket booster (SRB) recovery system was conducted successfully June 15 at the National Parachute Test Range, El Centro, Calif.

Tests were conducted using an SRB simulator, a drop test vehicle built by the Denver division, that weighed more than 48,000 pounds.

Results of the parachute tests will be elevated by engineers of NASA's Marshall Space Flight Center and of the division.

The drop test vehicle was released from beneath the right wing of a B52 operating out of NASA's Dryden Flight Research Center. The release was made from 18,000 feet at about 190 miles per hour.

One drogue parachute and, subsequently, three main parachutes were deployed successfully.

The test series is using a parachute system that is a significant advancement over any ever seen before — in size, weight, and strength.

The drogue chute alone weighs about 1200 pounds and is designed to withstand a load of 270,000 pounds. It is 54 feet in diameter.

Each main parachute weighs 1500 pounds, is designed for a load of 180,000 pounds, is 115 feet in diameter, and is twice as heavy as any ever developed.

The parachutes are made of nylon ribbons about two inches wide. The horizontal and vertical ribbons are about as thick as canvas, normally, but radial and other structural members are about as thick as military web belts. Each parachute has about a quarter of a million joints, each of which is double sewn.

Primary purpose of the first test was to check maximum operational load capability of the drogue chute which opens first to stabilize the vehicle and pull out the main chutes. Quick-look analysis indicates that the load of about a quarter of a million pounds was reached which is what was expected.

The next drop test, set for late July or early August, will check maximum operational load capability of one of the main parachutes. Eleven more tests are planned for late 1977 and the first half of 1978.

The division is prime contractor for the parachute recovery system with Pioneer Parachute Company as subcontractor for the parachutes.

C. W. "Bill" Spieth is heading the recovery system program for the division.

Two SRBs will be used on each space shuttle launch. They will be jettisoned on burnout, at an altitude of about 27 miles, for descent on parachutes into the ocean. They will be towed back to shore for refurbishment, refueling, and reuse. The parachutes will also be retrieved, refurbished, and reused.

NASA's Marshall Space Flight Center is responsible for development of the SRB, space shuttle main engine, and external tanks.

On the cover

First test of the solid rocket booster recovery system was successful. In the cover photograph, the drogue parachute and three main parachutes are deployed as the drop test vehicle descends to Earth.

SURGE classes begin Sept. 6

Classes at the division in the Colora State University Resources in Graduate Education (SURGE) program will begin Sept. 6.

Registration for the classes must be completed by Aug. 3. Forms and information on the program are available from Bette Wooster, RDL 412, ext. 5226.

The SURGE program offers graduate eduction opportunities in engineering and business. Live classes are videotaped on the CSU campus and the tapes are made available to the division.

More than 50 courses are being offered this year. However, availability of the tapes depends on sufficient registration for a particular course.

SURGE classes meet during the day in the classroom above the division's medical facility. Students may view the tapes outside working hours if time conflicts develop or travel plans force a student to miss a session.

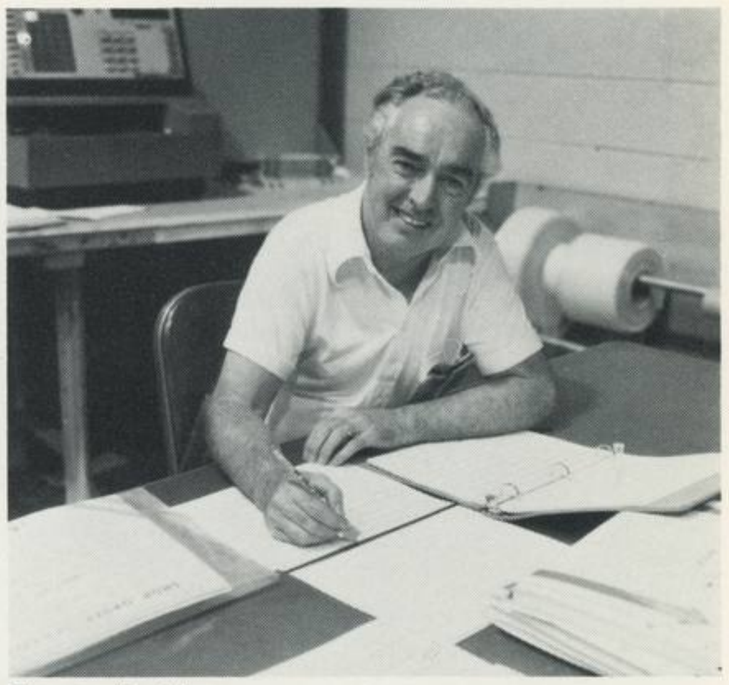
Employee honored for attendance

Thomas K. Dolan, lead expediter in production control, thinks people take more time off from their jobs than they should.

And, as the saying goes, he practices what he preaches.

Dolan recently was guest at a special luncheon honoring him for 26 years of perfect attendance. Host at the lunch was Robert G. Morra, who heads manufacturing, test, and structures engineering.

Dolan, however, denies his attendance is perfect. "I took a day off in 1955 because of a death in the family."



Thomas K. Dolan

That was when Dolan worked for Martin Marietta in Baltimore where he joined the company in 1940 in the planning section. (He left the company in 1945 and rejoined it in 1951.) Since coming to Denver in 1960 as a lead expediter, he hasn't missed a day.

Dolan has a simple explanation for his attendance record: "I have to work and the company pays me for being at work, not for staying home."

Being at work may run in the Dolan family. Tom's father "worked for the railroad 55 years and missed only three days." Tom's son is in the calibration lab at Gates Rubber Company. "He's been there nine years and I think he has missed only a day or two."

If James R. Myers, Tom's supervisor, hadn't mentioned the attendance record, no one would have known. Dolan would not have said anything. It wasn't until he got his 25-year service award that some of his fellow workers found out he had been with Martin Marietta that long and that he had started his career in Baltimore.

"It's no big thing," Dolan said, referring to both his 26 years with the company and his attendance record.

Technical operations: A different organization

The division's technical operations organization, with John D. Goodlette as executive director, is "not a classical, text-book like organization."

"We have an unusual set up in that we have vertically integrated the design, fabrication, and test functions," Goodlette said. "In most businesses like ours, you will find separate engineering and manufacturing functions — what is known as 'lateral organization.' We believe the organization we have developed is better suited to our current business, allowing us to keep more direct, in-line control of programs for our customers."

Technical operations has basic responsibility for engineering, manufacturing, quality control, independent research and development (IRAD), and the winning and carrying out of technology contracts that are important to the division's business future.

Goodlette also continues as director of the division's portion of the Viking project with employees stationed at Pasadena assisting in the extended exploration of Mars.

Technical operations departments and those heading them include:

Chief engineer, James L. Burridge; mission operations and software, Albert R. Schallenmuller; aerothermodynamics and propulsion engineering, Charles D. Brown; electronics, Reid H. Clausen; manufacturing, test and structures engineering, Robert G. Morra; quality and safety, George W. McGee; systems engineering, F. X. Carey (acting); product development, Lester J. Lippy; and business management, Jerome L. Tussey.

Burridge, as chief engineer, supervises the IRAD program, assures that new proposals contain good engineering, and serves as senior technical person for problems as they occur.

The mission operations and software department has two sections: mission operations and analysis, and the software systems development section.

- The mission operations and analysis section is responsible for what Goodlette calls the "classical trajectory and orbital mechanics kind of work." The section also analyzes missions for products the division develops for use in an operational environment and participates in flight operations, as on Viking.

- Those assigned to the department's software systems development section design and test software systems.

The aerothermodynamics and propulsion engineering department includes:

- Propulsion and mechanical engineering, which is responsible for liquid and gas systems for spacecraft, launch vehicles, and ground support equipment necessary to load propellants or gases at launch sites. The section controls the procurement of rocket engines the division buys. It provides technical leadership for propulsion fluid devices and all hardware.

- Thermophysics section, which is responsible for thermal control for spacecraft and for aerodynamics work.

- Engineering propulsion laboratory provides test cells and the data systems for propulsion and fluid system testing.

- The large environmental laboratories that have common use and common technical requirements among our spacecraft products.

The electronics department has six sections:

- Guidance and control, with responsibility for analysis, procurement, and laboratory testing of guidance and control equipment.

- Radio frequency systems and communications which deals with communications systems, simulators, and radar equipment.

- Digital systems section which designs and analyzes digital equipment, both airborne and ground based.

- Power section is responsible for power sources, including batteries, radioisotope thermal electric generators, and solar cells as well as power switching and control equipment.

- Payloads and sensors section designs and builds sensor equipment and intricate scientific instruments.

- Electronics manufacturing and product design is the manufacturing and product design section.

Manufacturing, test, and structures engineering sections include:

- Structures and materials engineering is responsible for structural design, materials analysis, and materials selection and use.

- Analytic mechanics section is concerned with loads and dynamics.

- Detail fabrication

- Final assembly

- Industrial engineering

- Production control

- Manufacturing engineering

- Projects section which sells manufacturing services outside the company, handles intracompany manufacturing, and acts as a project office.

Quality and safety has sections for

- Quality control

- Systems safety and quality assurance

Systems engineering assures that the systems requirements are analyzed, documented, and understood. This department is the technical arm of our project offices and is a key interface with major division customers in technical matters. It makes certain other departments have well-defined tasks, monitors their progress, leads design reviews, and defines and conducts systems tests.

The product development department handles the miniproduct areas. These are products, or technologies, that have become too large in a business sense to be managed as a piece of another department, but are too small to be organized as a major product area. Among projects under this department are:

- Solar thermal energy

- Capillary devices and tanks

- Electronics projects, primarily for space shuttle

- High density tape recorders

- Solid rocket booster (SRB) recovery system

The business management department is responsible for administration and budget, contracts, planning, and other financial fuctions of technical operations.

Goodlette and technical operations also have staff support from professional and industrial relations, marketing, and the Denver Data Center.

New Titan model gets go ahead

Robert F. Johns, who began his Martin Marietta career as a test engineer on the Titan I program in 1958, is now heading the division's newest Titan program — the Titan III 34D.

"We have received the go ahead on phase one of the program and we are working on the phase two long-lead proposal," Johns said. "Both phases will continue until February 1978 when the final engineering, testing, and building of the vehicle will begin."

Robert F. Johns

In phase one, the division will do the preliminary design and analysis for the Titan III Interim Upper Stage (IUS) system. Included are the analysis of the mission, performance, loads, and environment.

End item specifications also will be prepared during phase one as will the preliminary design of a new redundant avionics system and the design of the Titan-to-IUS structural adapter.

It is anticipated the newest member of the Titan family will be used for primary missions through 1984 and after that in the role of back-up launch vehicle for space shuttle.

Detail design of the Titan/IUS adapter will be completed in the phase two long-lead program with a critical design review (CDR) scheduled in December 1977. It is expected the adapter will go into production in January 1978.

Also in the phase two long-lead program, the division will develop the input/output box that will interface with the IUS inertial guidance system. One unit will be built for testing in the division's guidance and control lab and another will be fabricated for use by Boeing in the development testing program of the inertial guidance system that company is building for IUS.

Johns, who received a BS degree in civil engineering and a BS degree in business administration from the University of Colorado, also said the division has been given direction to begin converting three Titan IIIC vehicles, now in the early stage of fabrication, to the 34D configuration.

The new Titan III 34D program director became head of the project when Peter B. Teets was named a Sloan Fellow and left for a year's study at the Massachusetts Institute of Technology.

Except for a stint as technical director for the advanced programs manned space systems in the early 1970s, Johns has been assigned to various positions on the Titan program. He was Titan I launch complex manager at Buckley Field, worked on the structures and propulsion project for Titan III, and has been project engineer and program director for the Titan IIIB and IIID program.

In addition to heading the Titan III 34D program, Johns is also leading the programmable aerospace control equipment (PACE) effort.

MARTIN MARIETTA NEWS
Published by Public Relations
MARTIN MARIETTA AEROSPACE
Call Ext. 5364 with suggestions or information for articles.
Denver Division
P.O. Box 179
Denver, Colorado 80201
July 1977

Legislative affairs chief is named

Charlotte I. Simpson has been named chief of legislative affairs for the division.

Charlotte I. Simpson

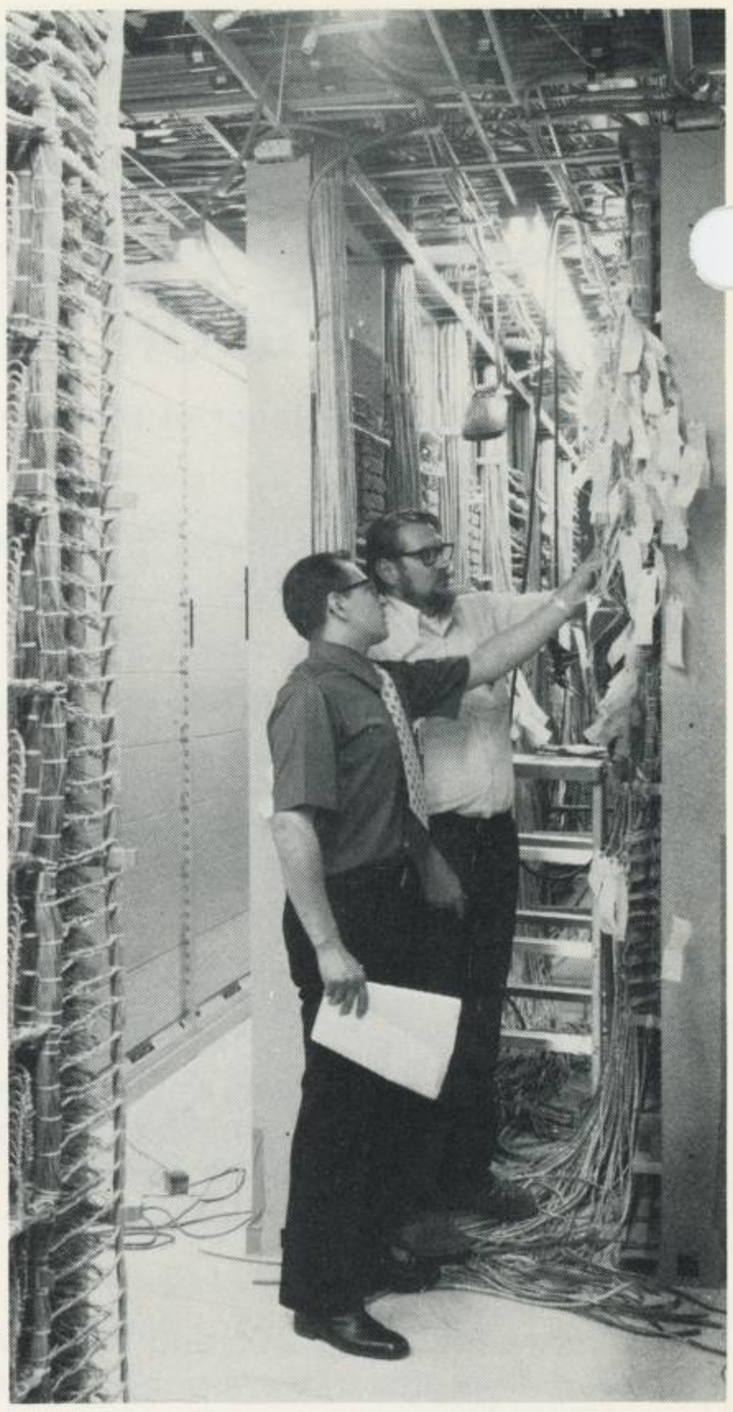
She will be responsible for monitoring pending and approved legislation in the United States Congress, for assessing the legislation's impact on the division and its business, and for communicating the information to those in the division who will be affected by the congressional action.

Miss Simpson has held various positions with federal government agencies and departments. Before coming to Martin Marietta, she spent more than seven years in the legislative affairs office of the Commander in Chief, Pacific (CINCPAC) at Camp Smith in Hawaii.

She began her government career in 1963 as an employee of the Navy department. She transferred to the Defense Communication Agency in 1967.

From 1968 through 1969, she was on the U. S. Embassy staff in Viet Nam.

She has attended the University of Hawaii.



Virgil Jaramillo, who is coordinating Centrix installation for the division, discusses wiring for the system with Western Electric installer Richard T. Dowe.

New telephone system to be operating in October

Installation of a Centrex telephone system for the division is underway. The system will go into operation Oct. 17.

The new equipment will permit incoming local and long distance calls to be dialed direct to telephone extensions at the division's main facilities. Outgoing MARCOMNET and long distance calls will continue to be processed by the division's switchboard attendants.

A tape-slide presentation has been prepared to acquaint all employees with the Centrex features and operation. Orientation sessions will be conducted in October.

The training schedule will be announced in September.

Virgil Jaramillo of the plant operations and telecommunications department is coordinating the installation activities. The installation is on schedule.

Three employees earn top corporate honors

Three Denver division employees were accorded top honors at the annual Corporate Honors Night held by Martin Marietta in Washington, D.C. in late June.

Named Corporate engineer of the year was H. E. Craig.

Bruce D. Maytum and Charles W. White shared the Corporate author of the year honors as co-authors.

Eleven other division employees were awarded the coveted Jefferson Cup — symbol of Martin Marietta's appreciation for outstanding individual contribution to the corporation.

Craig, director of Viking spacecraft performance and flight path analysis, was cited for "outstanding technical leadership in design and systems engineering which contributed significantly to achieving a flawless Viking lander descent and a successful scientific exploration of Mars."

Maytum, a senior engineer, and White, a senior staff engineer, were honored for their paper "Eigensolution Sensitivity to Parametric Model Pertubations," published in *Shock & Vibration Bulletin,* No. , Part 5, August 1976.

Others honored:

Carolyn G. Cooley — for contributions to the Viking Mars lander mission by integrating all scientific requirements and mission plans into workable and adaptive lander sequences.

John D. Goodlette — for outstanding dedication and technical leadership in the development of the Viking Mars lander.

Lester J. Lippy — for outstanding dedication and accomplishment in performing system test programs contributing to the successful checkout and launching of the Viking Mars lander.

Walter O. Lowrie — for outstanding program and technical leadership in the design, development, and landing of two Viking Mars landers.

Leroy F. Nichalson — for outstanding contributions to the technical proposal which resulted in the award of a contract to the Denver division for the space shuttle ground systems support program.

James D. Porter — for contributions to the success of the Viking program by virtue of his development of mission planning models and spacecraft requirments responsive to the scientific objectives of the Mars mission.

James B. Sanders — for outstanding direction of the U. S. Navy tactical flag command center pre-proposal effort.

Albert R. Schallenmuller — for leadership in development and operation of the worldwide tracking, command, and central computing and control facilities which returned vital data from the Viking Mars mission.

James A. Sterhardt — for leadership in the development of the structural, thermal, and mechanical systems of the Viking Mars lander.

G. Lee Tarlton — for outstanding management of the space shuttle external tank program procurement activties, contributing to the successful accomplishment of all program structural, hardware, and manufacturing schedules.

Eugene C. Wood — for outstanding leadership which resulted in meeting the technical, cost, and schedule goals for the development of the space shuttle checkout, control, and monitoring subsystem.

Controller is elected corporate vice president

The Board of Directors of Martin Marietta Corporation has elected Melvin A. McCubbin a corporate vice president.

Melvin A. McCubbin

McCubbin, who has been controller since 1974, joined the corporation in 1958 and was controller and treasurer of Martin Marietta Aerospace from 1969 until 1974. His new position is vice president and controller of the corporation.

A native of Maryland, McCubbin earned a bachelor of science degree in accounting from the University of Maryland in 1952 and a bachelor of laws degree from the University of Baltimore in 1961. He is a member of the Maryland, Baltimore City, and Baltimore County bar associations and is admitted to practice before the U. S. Supreme Court. He is also a member of the Financial Executives Institute and the National Association of Accountants.

symbol of Martin Marietta's appreciation for outstanding individual contribution to the corporation.

rench President Giscard d'Estaing, in photo at left, discusses the mobile Viking laboratory with James S. Martin, vice president of Martin Marietta Aerospace. The working model of the laboratory, which could rove Mars in the early 1980s, was on display in the United States Pavilion at the Paris Air Show at Le Bourget airport. Among other distinguished visitors to the Viking exhibit was, in photo at right, Ann Morrow Lindberg, widow of Charles A. Lindberg, the Atlantic-spanning pilot whose epic flight 50 years ago was marked by the air show.

MARTIN MARIETTA
news
MICHOUD OPERATIONS

Hurricane season is here again

It is hurricane season again! From June through November, weather conditions in the Carribean are ideal for the development of tropical disturbances into hurricanes. Because of the erratic nature of these storms, each contractor in the Michoud Assembly Facility (MAF) has developed and published an Emergency Destructive Weather Plan to minimize personnel injury and property damage. Hurricanes require maximum readiness and rapid, organized response after their passing.

Each year, MAF assumes a **Condition V** posture June 1, the beginning of the hurricane season. More stringent conditions are:

Condition IV —Possibility of winds 55mph or greater within 72 hours. MAF assumes a general state of readiness.

Condition III — Possibility of winds 55mph or greater within 48 hours. Preparations for hurricane in progress.

Condition II — Probability of hurricane winds within 24 hours. Final preparations completed.

Condition I — Arrival of hurricane winds forecast within 12 hours.

When a tropical disturbance is detected, its progress is closely monitored for possible change of condition. During Condition IV, progress reports of storm development and heading will be posted periodically throughout Martin Marietta areas of MAF. These reports continue until Condition I is declared or the storm no longer poses a threat to the Greater New Orleans area.

When Condition II is declared, all personnel are released, except for the emergency crew which remains on site throughout the storm. Those dismissed from work should expect to return for their next regular shift, unless instructed otherwise by radio or television announcement or phone call from their supervisor. Radio and TV stations to monitor for emergency information are:

Radio — WWL Radio 870, WYLD Radio 940, WGSO Radio 1280.

TV — WWL Channel 4, WSDU Channel 6, WVUE Channel 8.

After the storm has passed, the company's recovery plan is initiated. The professional and industrial relations department will activate the personnel information and relief center to assist in location of all employees and determination of the extent of personal loss and injury. The center will also coordinate assistance actions within corporation capabilities after need priorities have been established.

Look for a follow-up article on individual safety precautions and practices to minimize property damage, injury, and loss of life during hurricanes in a later edition of *Martin Marietta News.*

In Michoud

Call Ray Lacombe at 3606 with suggestions or information for articles for Martin Marietta News.

The 97-foot long liquid hydrogen tank is shown being removed from Cell E following cleaning and installation of cabling and instrumentation. In the second photo, the 31,600 pound, 53,500 cubic foot capacity cylinder is shown suspended next to Cell E. An overhead crane then moves it into the aisle at the west end of the vertical assembly building. The tank, which can contain 227,537 pounds of liquid hydrogen is positioned by an operator 200 feet above floor level. By radioed instructions, the operator then lowered the tank to a horizontal position on two cradles. Further instrumentation was performed, after which the tank was moved into Cell B and installed on a turntable adapter for primer and TPS appreciation.