

January 31, 1986

Number 2

In memoriam

Seven-member crew of space shuttle Challenger, front row, left to right, co-pilot Michael J. Smith, commander Francis Scobee, and Ronald McNair. Back row, from left, Ellison Onizuka, Christa McAuliffe, satellite engineer Gregory Jarvis, and Judith Resnik.



On January 28, 1986, the space shuttle Challenger on Mission 51L exploded about a minute after launch. All seven crewmembers onboard were killed in the tragic accident. NASA has formed a special committee to investigate the accident.

"I know I share the pain of this tragic loss with all Martin Marietta people, and we mourn the loss of seven heroes," said Peter B. Teets, Denver Aerospace president. "But, we must rededicate ourselves to continue the space program with more intensity than ever before."

The crewmembers killed on that mission were:

Francis R. (Dick) Scobee—spacecraft commander. Born May 19, 1939 in Cle Elum, Washington, he became a NASA astronaut in 1978. He received a B.S. degree in aerospace engineering from the University of Arizona. He was married to June Kent Scobee, and was the father of two children. Scobee's Air Force experience included a number of assignments, including a combat tour in Vietnam. He had logged more than 6500 hours in 45 types of aircraft. He was the pilot of STS 41-C in 1984, which deployed the Long Duration Exposure Facility, and repaired onboard the malfunctioning Solar Maximum Mission satellite.

Michael J. Smith—Commander, U.S. Navy, pilot. Born April 30, 1945 in Beaufort, NC, he became a NASA astronaut in 1980. He received a B.S. degree in naval science from the U.S. Naval Academy, and an M.S. degree

in aeronautical engineering from the U.S. Naval postgraduate school. He was married to Jane Jarrell Smith, and had three children. Smith completed a Vietnam tour, and was awarded the Navy Distinguished Flying Cross, three Air Medals, 13 Strike Flight Air Medals, the Navy Commendation Medal with "V", the Navy Unit Citation, and the Vietnamese Cross of Gallantry with Silver Star.

Judith A. Resnik—mission specialist. Born April 5, 1949 in Akron, Ohio, she received a B.S. degree in electrical engineering from Carnegie-Mellon University and a Ph.D. in electrical engineering from the University of Maryland. She became an astronaut in 1978, and was a mission specialist on STS 41-D, which deployed three satellites, and had logged more than 144 hours in space. She was a biomedical engineer at the National Institutes of Health, and served as senior systems engineer with Xerox Corporation.

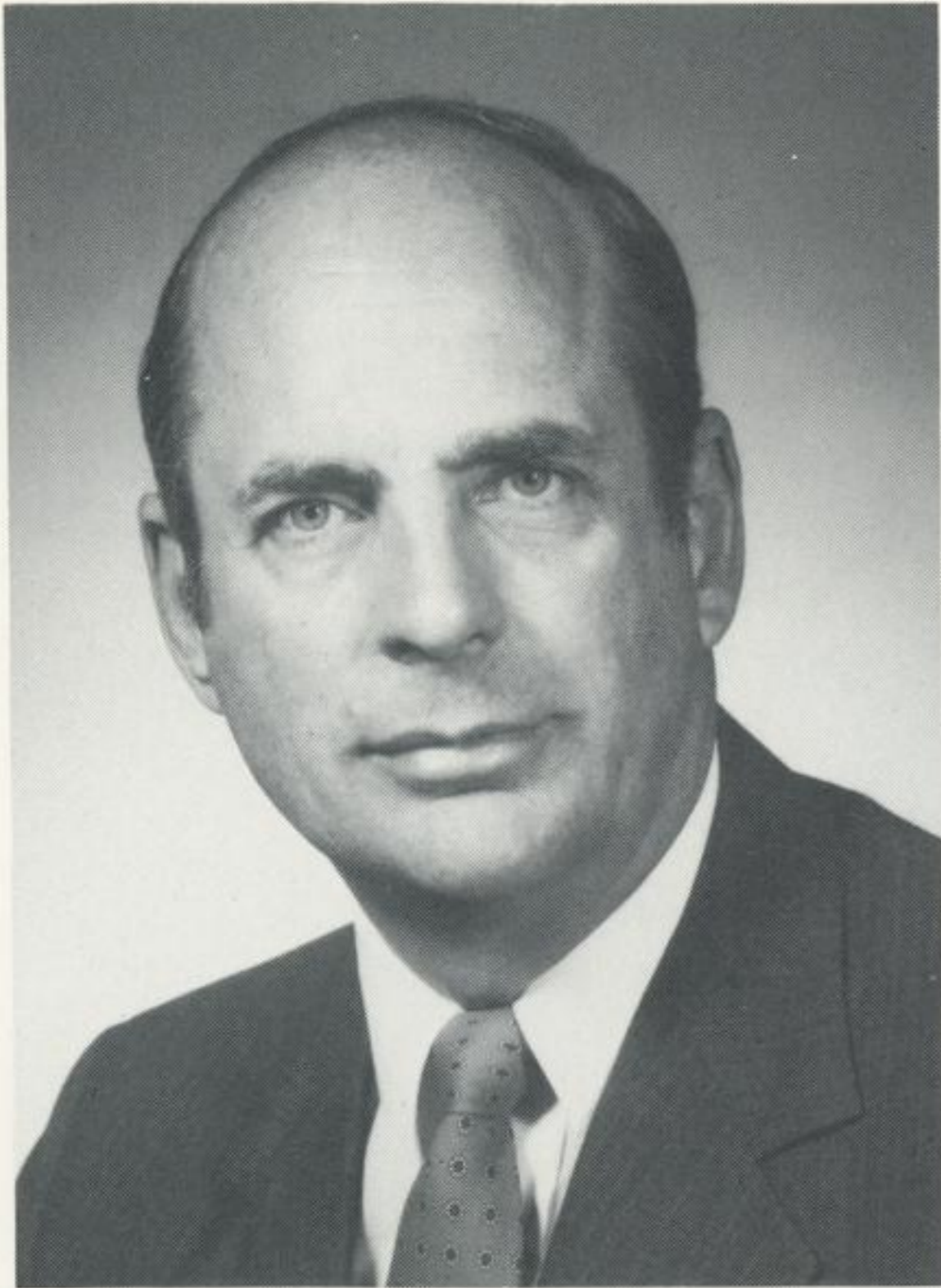
Ronald E. McNair—mission specialist. Born October 21, 1950 in Lake City, S.C., he received a B.S. degree in physics from North Carolina A&T State University and a Ph.D. in physics from the Massachusetts Institute of Technology. He became an astronaut in 1978. Dr. McNair was married to Cheryl Moore McNair, and had two children. He was a staff physicist with Hughes Research Laboratories. He was a mission specialist on STS 41-B, which deployed two satellites, and was the first flight of the Manned Maneuvering Unit

Ellison S. Onizuka—Lt. Col., USAF, mis-

sion specialist. Born June 24, 1946 in Kealahou, Kona, Hawaii, he received B.S. and M.S. degrees in aerospace engineering from the University of Colorado. He became an astronaut in 1978. He was married to Janelle Mitsue Onizuka, and had one child. Onizuka was an aerospace flight test engineer at McClellan Air Force Base, and participated in numerous flight test programs, logging more than 1700 hours of flying time. He was a mission specialist on STS 51-C, the first dedicated Department of Defense mission.

Gregory B. Jarvis—payload specialist. Born June 24, 1946 in Detroit, Michigan, he received a B.S. degree in electrical engineering from the State University of New York, and an M.S. degree in electrical engineering from Northeastern University. He became an astronaut in 1984. He was married to Marcia Jarboe Jarvis. Jarvis worked at Raytheon, designing circuits on the SAM-D missile, with the Satellite Communications Program Office.

S. Christa Corrigan McAuliffe—Teacher in Space participant. Born September 2, 1948 in Boston, she received a B.A. degree from Framingham State College and an M.S. degree in education from Bowie State College. She was married to Steven McAuliffe, and the mother of two children. McAuliffe taught English and American history since 1970. Until her selection as a primary candidate for the Teacher in Space project in 1985, she taught economics, law, American history, and a course she developed—"The American Woman"—to 10th and 12th grade students. ■



Norman R. Augustine



Laurence J. Adams

Augustine named president; Adams sets retirement

Former Denver Aerospace president Norman R. Augustine has been elected president and chief operating officer of Martin Marietta Corporation, effective April 1. He succeeds Laurence J. Adams, who will retire on that date after 38 years with the Corporation. Adams will continue as a director of the Corporation.

In announcing the Board's action, Thomas G. Pownall, chairman and chief executive officer, said, "Martin Marietta is in the enviable position of having in place a man of Norm Augustine's stature, experience, and demonstrated abilities as an engineer, manager, and executive leader to succeed Larry Adams, whose wisdom, foresight, and executive strengths we are fortunate to retain on the Board of Directors."

Augustine, 50, is a 27-year veteran in the aerospace industry and government. A graduate of Denver's East High School, Augustine

earned bachelor's and master's degrees from Princeton University. He joined Martin Marietta in 1977 and was president of Denver Aerospace from 1982 to 1985. For the past year Augustine has had primary executive responsibility, first as senior vice president and then as executive vice president, for the fastest growing area of the Corporation, information management technology.

Adams has been president and a director of the Corporation since 1983. He joined the predecessor Glenn L. Martin Company at Baltimore in 1948 following graduation from the University of Minnesota, and has spent his entire career with the Corporation in increasingly important engineering and management positions. He was director of engineering and later general manager of the Denver operation before serving as president of all aerospace operations for six years before becoming president of the Corporation. ■

Corporate news

Pownall reappointed to national volunteer committee

Secretary of the Treasury James A. Baker, III, has reappointed Thomas G. Pownall, chairman and chief executive officer of the Corporation, to the U.S. Savings Bonds Volunteer Committee for a second year. Pownall will serve as chairman of the Aerospace Industry Savings Bond Campaign.

In announcing the reappointment, Secretary Baker said, "It is a great pleasure to have someone of Mr. Pownall's caliber as a member of our National Committee. By volunteering, Mr. Pownall demonstrates one of the keys to America's greatness—the cooperation of business and government for the good of our Nation and its citizens.

"The function of this national campaign is to promote the sale of U.S. Savings Bonds through company payroll savings plans.

Company to study satellite refueling

Denver Aerospace is conducting a nine-month design study for a fuel resupply system that would allow the space shuttle to service satellites and other spacecraft while in orbit.

The company was awarded one to three parallel contracts to conduct a design study for an orbital spacecraft consumables resupply system (OSCRS) by NASA's Johnson Space Center. The contract work is valued at approximately \$570,000.

The first projected mission for the fuel resupply system will be in 1990—refueling the Gamma Ray Observatory, a spacecraft slated for launch in 1988.

"As presently conceived, the space shuttle would initially carry the resupply system into space in the payload bay," explained Thomas R. Tracey, program manager for the study. "It would carry about 5000 pounds of monopropellant hydrazine—fuel used in satellites for maneuvering and attitude control."

Space shuttle astronauts would retrieve the spacecraft or satellite to be refueled and use the shuttle's remotely operated manipulator system to position it near the resupply system. Astronauts would then enter the shuttle cargo bay and connect the fuel resupply lines to the satellite.

Development of an orbital refueling system is considered necessary for activities related to the planned space station and spacecraft that will be retrievable, such as the orbital maneuvering vehicle (OMV).

"This system could significantly expand the life of spacecraft, which would be more economical," Tracey said. "It can be very cost effective, especially along with servicing and repairing spacecraft, also under consideration."

The system would be designed as a "filler" payload on the space shuttle—fitting into as little space as possible in the payload bay. The next phase of the current study program, expected to be awarded in late 1986, will be an open competition selecting a contractor to build and test the actual hardware for such a fuel resupply system.

Martin Marietta has conducted previous studies and demonstrations of orbital fluid management systems, and is also involved in studies of the OMV and the common modules for the space station. ■

To everyone who
gave to the United
Way, we have only
two words for you:

Thank You!

Company helps explore Uranus

When Voyager 2, launched in 1977, streaked within 50,000 miles of the greenish, methane-tinged atmosphere of Uranus, two centuries of mystery surrounding the planet began to clear.

And Martin Marietta has played a key role in the spacecraft's exciting mission.

In addition to providing the Titan IIIIE Centaurs that boosted both Voyager 1 and 2 spacecraft in 1977, Denver operations integrated launchsite activities and acted as test conductor.

Onboard Voyager 2 is equipment designed and built by Martin Marietta for the Jet Propulsion Laboratory (JPL) in Pasadena, Calif., builders of the spacecraft.

"All systems worked or are working outstandingly well, according to my last update from JPL," said Grover W. Hall, now director of defense systems.

James W. McNally was Voyager program manager for development until 1975, when Hall became program manager for all flight hardware provided to JPL.

"We supplied the propellant control assembly for the Voyager propulsion system; the remote driver module, which includes the electronics to control valves and thrusters of the spacecraft's attitude control system, which also was used to kick the spacecraft outside of Earth's inertial system; and the hybrid buffer (HYBIC) and interface circuits which are the input/output electronics for the spacecraft computer," Hall said. "HYBIC, the main logic system for the attitude controller computer, is still in action and working perfectly."

The memory access module, that provides additional equipment to supplement the on-board computer, is also still active and working perfectly, Hall said.

"We also provided the architectural support to JPL for system-level fault detection analysis to analyze the total spacecraft for redundancy, which also contributed to the mission's success."

Martin Marietta began support work for Voyager in 1974, and continued through 1976. "Once we delivered the hardware to JPL, we were on an on-call basis," Hall said.

The project received 100 percent award fees from NASA on the flight hardware.

Speeding past Uranus at 45,000 mph, information and pictures began to flow across the 1.84 billion miles separating Uranus and the Voyager controllers at JPL. After nine years of travel, the instrument-studded spacecraft began to send stunning photographs of Miranda, the moon closest to Uranus, with an astonishing array of geological features on the tiny sphere, according to the U.S. Geological Survey.

The tiny moon—barely 300 miles in diameter—stole the show on January 26 with extremely clear photographs showing mountains and valleys and other features that scientists are so far unable to explain. ■



James A. Sterhardt, right, vice president, Strategic Systems, presents the key to Martin Marietta's hard mobile launcher mobility test vehicle to Brig. Gen. Edward P. Barry, Jr., vice commander, Ballistic Missile Office, and program director for the Small ICBM. The vehicle was officially turned over to the Air Force in Yuma, Arizona on January 24.

Air Force accepts test units for hard mobile launcher

The Air Force officially accepted two full-scale mobility test vehicles on January 24 at Yuma, Arizona. The vehicles are representative of the hard mobile launcher (HML) designs for the small intercontinental ballistic missile (SICBM).

The vehicles were built to demonstrate mobility characteristics of two launcher designs developed by the two competing HML contractors: Martin Marietta Corporation and Boeing Aerospace Corp. The HML, as envisioned, will protect, transport, and launch the SICBM, a new single-warhead missile currently under development by the Air Force. Hard mobile launchers and superhardened silos are the two basing modes under consideration for the SICBM.

The Air Force will evaluate the vehicles with onroad and offroad tests, and reliability, maintenance, and survivability criteria at Yuma Proving Grounds through June. Selection of a final design for development is ex-

pected in October.

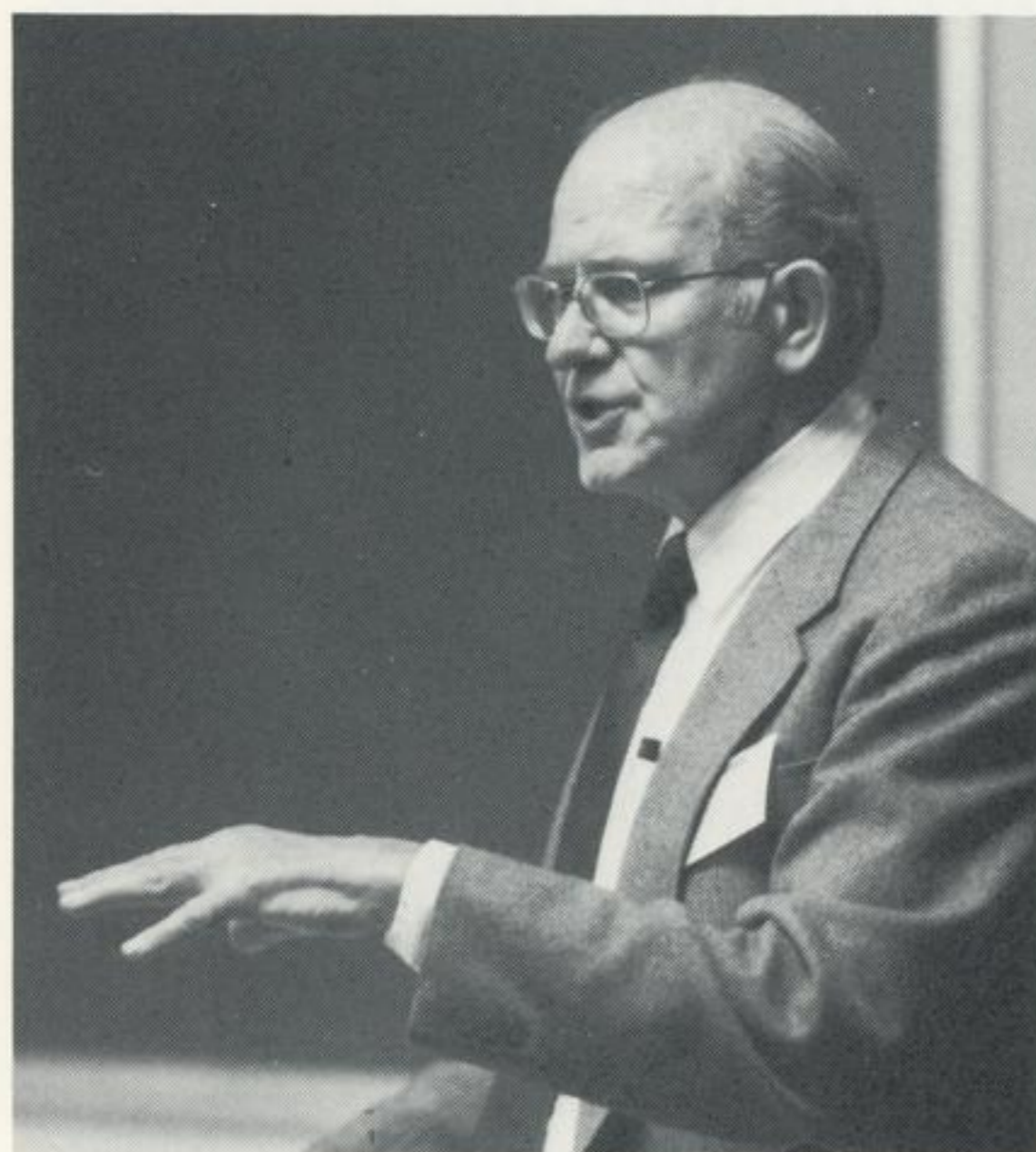
Martin Marietta and teammate Caterpillar Tractor Co., designed and built a 91-foot long mobility test vehicle as part of the competitive \$46.9 million contract, under which Denver Aerospace is responsible for the overall hard mobile basing program.

The HML mobility test vehicle consists of a missile module built by Martin Marietta at its Baltimore Aerospace manufacturing plant in Maryland, and a crew module built by Caterpillar at its Peoria, Illinois, plant.

First tested in Peoria, the vehicle was demonstrated to senior Air Force personnel last September. Capable of both onroad and offroad operation, it has a top speed of more than 55 miles per hour. In November, the vehicle was shipped to Phoenix for further tests.

The Air Force Ballistic Missile Office at Norton Air Force Base, California, is developing both the SICBM and hard mobile launcher.

News briefs



Dr. Lew Allen

JPL director addresses large staff meeting

Dr. Lew Allen, Jr., vice president of the California Institute of Technology and director of the Institute's Jet Propulsion Laboratory (JPL), visited Denver Aerospace in December.

Dr. Allen and his staff met with Peter B. Teets, Denver Aerospace president, and received a briefing on the Venus Radar Program—newly renamed the Magellan project—by Charles D. Brown, program director.

Dr. Allen held the rank of general, and was Chief of Staff of the U.S. Air Force and a member of the Joint Chiefs of Staff until his retirement in June 1982.

VRM mission now Magellan project

The Venus Radar Mapper (VRM) project has a new name—the Magellan project—NASA's Solar System Exploration Division announced this month.

The name Magellan is consistent with NASA's general plan for naming major planetary missions after noted historical persons, such as scientists, mathematicians, astronomers, or explorers. Magellan is deemed a relevant name by NASA because it connotes exploration, discovery, and circumnavigation, qualities all present in the mission.

The project is designed to make a geographical, topical map of the surface of Venus in 1988. The spacecraft, designed and built by Denver Aerospace, will be launched from the space shuttle by a Centaur upper-stage rocket adaptor. The spacecraft will use synthetic aperture radar to map 90 percent of Venus' surface in a 243-day mission and relay data back to Earth.

NASA said the name Magellan should be used on all future communications with Congress, the science community, the public, in all NASA documents, and in new documents.

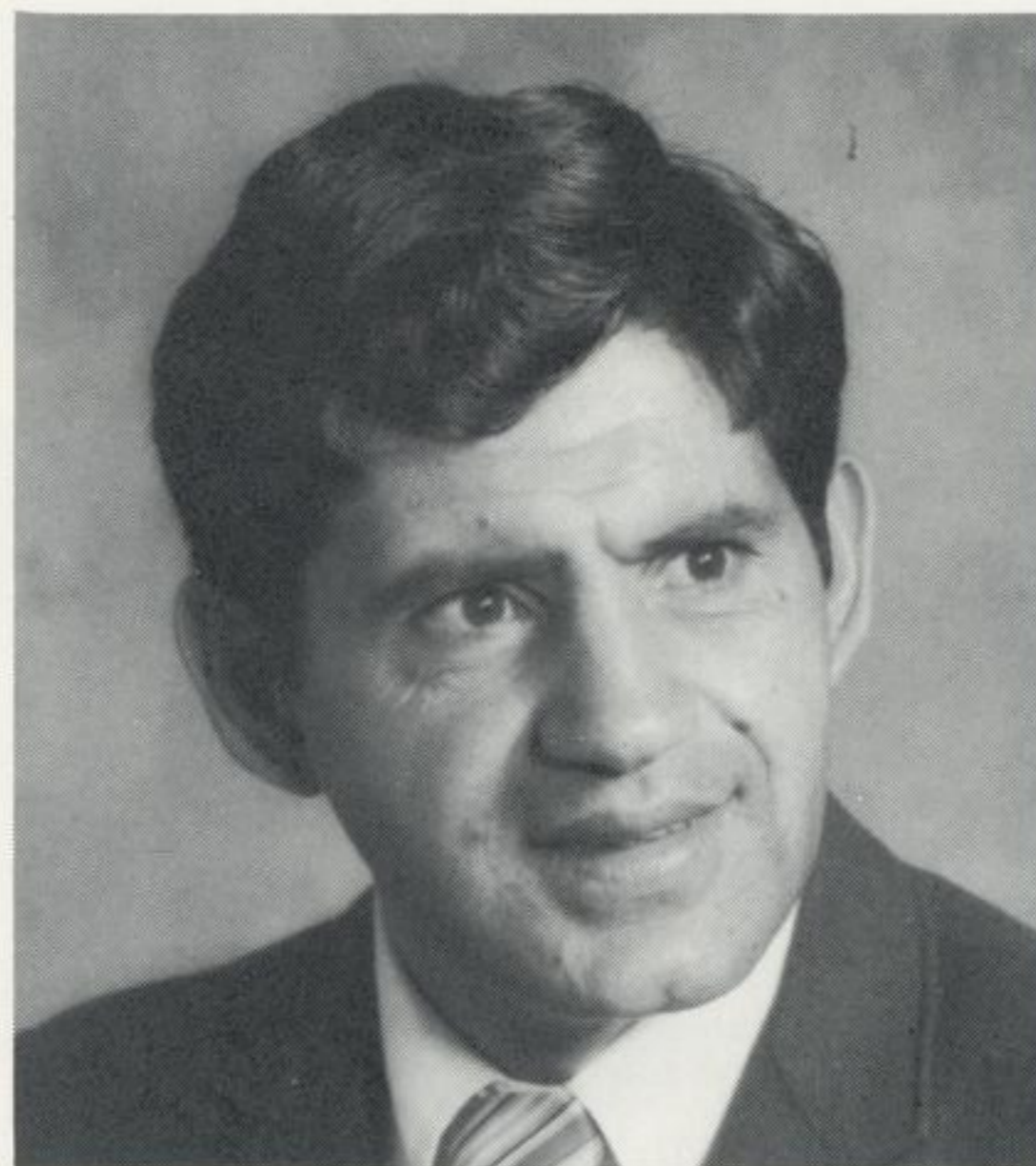
Arrazola named coach for Pan-Am games

A dream came true for Joseph Arrazola last December. He was named distance coach for the U.S. men's track team. The team will compete in the 1987 Pan-American Games in Indianapolis.

Arrazola, a plumber at Denver Aerospace, was selected by a 40-man panel of the International Competition Committee of the Athletics Congress (TAC). TAC is the national governing body for U.S. track and field.

"As a runner, you always dream that someday you'll get the opportunity to represent your country," Arrazola said. "This is very exciting."

An active member in TAC for the past 10 years and the Amateur Athletic Union (AAU) since 1961, Arrazola has been active in track and field since high school in Hoehne, Colorado, and competed for the U.S. Army in the states and in Europe. Arrazola has coached track at Metropolitan State College, and is assistant cross-country coach at Arapahoe High School.



Joseph Arrazola

I&CS announces general counsel

Joseph J. Nolly has been appointed general counsel for the Information & Communications Systems, effective January 1, 1986.

Nolly will report to Robert J. Polutchko, I&CS president, regarding legal matters and functionally to Harry L. Smith, Corporate Headquarters legal staff.

Nolly earned a bachelor's degree in political science from the State University of New York and a Juris Doctor from Tulane University of Law. Previously, he was assistant general counsel for Orlando Aerospace, Martin Marietta Aluminum Inc., and Corporate Headquarters.

DOD regulates travel bonuses

Martin Marietta has received notification from the Department of Defense that travel bonus awards accrued by employees while on company business travel are to be treated as government property when such travel costs are charged to the government. The government specifically prohibits the use of such benefits for personal gain.

In accordance with this Defense Department directive, Martin Marietta will put into effect the following policy immediately:

All "Frequent Flyer" airline bonuses awarded to employees after January 23, 1986, in connection with Martin Marietta government-reimbursed travel, shall be turned over to the Company to be used to offset the cost of future business-related travel.

In a recent letter addressed to all employees, Laurence J. Adams, president and chief operating officer of the Corporation, writes: "As a defense contractor, we must comply with the above government policy and, hence, require the compliance of each Martin Marietta employee affected." ■



Patricia L. Jones

Project Referral award announced

Patricia L. Jones, a specialist associate for engineering administration, won \$2000 during a recent Project Referral drawing. Jones received the award for referring John A. Edrich, systems safety engineer, to Denver Aerospace.



AN/MSR-T4 mobile van is tested before delivery to the Air Force.

Waterton site included in bird count

The December wild bird census attracted over 41,000 participants nationally—140 from the Denver area—the largest amateur collection effort ever undertaken.

“The bird watchers, or birders, found 601 different bird species across the United States and 99 different bird species in Denver,” said Kenneth LaBorde, a staff engineer for Denver Information & Communications Systems. “Information from this Christmas count is used by scientists studying North American winter bird distributions.”

LaBorde and John Sanden, also with I&CS, covered the upper Deer Creek Canyon section. Laborde has been an avid birder for the past 10 years, he said.

For the first time in the 32-year history of the Denver count, the Waterton facility was included. Led by David Martin from the Denver Field Ornithologists, three Martin Marietta employees—Jim Allison, Paul Scheffer, and Debbi Death—helped find 33 species of birds on company land and adjacent Waterton Canyon. Notable finds included a Northern Pygmy Owl, which was “pretty uncommon,” LaBorde said, “usually only seen every four or five years during a Christmas count.” The group also spotted three Bald Eagles, two Golden Eagles, and an Eastern Screech Owl.

In addition, the group sighted nine Rocky Mountain Bighorn Sheep, and tracks of a pair of mountain lions in the Waterton Canyon.

Those interested in participating in next year's count should contact Jim Allison, ext 7-5461; Ken LaBorde, 973-3548; or David Martin, 422-9143, after 5:30 p.m. ■

I&CS delivers test equipment for modern electronic combat

The first three multiple-receiver systems designed and built for the Air Force by Martin Marietta Information & Communications Systems have been delivered to strategic training ranges. There, they are being used by the Air Force to test equipment and evaluate pilot proficiency for modern electronic combat.

Robin Knox, manager of the AN/MSR-T4 (the military designation) program in Denver, said one system was delivered in September 1985 to the Air Force in Europe. A second was turned over to the Strategic Air Command (SAC) at La Junta, Colo., while a third was turned over to SAC at Wilder, Idaho, both in December 1985. These systems also will be used by the Tactical Air Command (TAC).

Denver I&CS is building seven of the AN/MSR-T4 systems under a \$47.8 million contract with the Air Force Armament Division at Eglin Air Force Base, Florida. Each system consists of a mobile van equipped with computers, antennas, multiple receivers, and an antenna switching and signal conditioning matrix.

AN/MSR-T4 is used at the training ranges to intercept and analyze electronic countermeasures and communications jamming signals for evaluation. “The system makes sure the electronic countermeasure being emitted from aircraft is what the technical orders specify,” said Capt. Tom Merriman, AN/MSR-T4 program manager at the Eglin AFB Armament Division.

The Air Force also plans to use the AN/MSR-T4 to verify and calibrate signals from ground-threat radars at training ranges. That is expected to help air-crews and maintenance people who, in the past, had no way to isolate with threat emitters. ■

Company will study satellite retrieval

Martin Marietta is conducting a series of design studies to develop future unmanned space retrieval systems to capture malfunctioning satellites, repair them in space, and then return them to service.

The studies, for NASA, include development of various spacecraft retrieval kits that could be attached to the front end of an Orbital Maneuvering Vehicle (OMV)—a free-flying, remotely operated spacecraft that would operate in low-Earth orbits, ferrying spacecraft to and from the space shuttle or a future space station.

The company has extensive experience in developing space systems that could be applied in the research effort, including the Manned Maneuvering Unit (MMU). The \$150,000 award is for a 1-year contract from NASA's Marshall Space Flight Center (MSFC) to study designs for a mechanism that would help snare spacecraft that experience failures in their attitude control system. Such spacecraft might be tumbling erratically in orbit, and be

difficult to grasp without causing damage to the spacecraft.

Company engineers are looking into systems that could attach to an Orbital Maneuvering Vehicle (OMV), permitting this type of orbital retrieval. The company will also study equipment that could be incorporated into the design of future satellites and spacecraft to make onorbit rescue efforts easier.

Servicing satellites in need of repair or maintenance has been the focus of a separate \$350,000, 18-month study for MSFC to define robotic systems and related tools that could provide for removal and replacement of various modules on an orbiting spacecraft. The study will look at methods to service multimission module spacecraft and other satellites to enable module replacement of critical systems by remote-controlled devices on OMV.

Bill L. DeRocher Jr., is manager of OMV advanced projects, and Dick A. Cable is study manager for the project. ■

Employee services/recreation

Bowling—Anthony Giuliani won the Martin Marietta Master's Bowling Tournament held at Green Mountain Bowling Center on January 18. Of the 24 bowlers who qualified for the semifinals, eight bowled a round robin to determine the winners. Richard Tidd won second place, and Floyd Teiffel was the third place winner.

Smoking—Company-sponsored smoking cessation programs will begin in February and March. Conducted by Presbyterian/Saint Luke's Medical Center, the smoking management clinics are free to employees; spouses and dependents may attend at the corporate discount rate of \$175. The February class begins with a free, introductory seminar at 5 p.m., Wednesday, February 5, at Goddard Junior High, 3800 W. Berry Avenue. Preregistration is not necessary.

Archery—The Archery Club will meet at 4:45 p.m. on February 12 in the club room at the recreation area.

Alpine skiing—The Rocky Mountain Alpine Club will hold a one-day beginner/intermediate cross-country ski trip to French Pass on Saturday, February 8. For further information, contact Frank Farrell, ext 7-6931.

Skiing—The Satellite Ski Club will hold its February meeting from 7 - 9 p.m. on Wednesday, February 12, at the Peachtree II Clubhouse.

Auto testing—The mobile emission testing service becomes available to employees in February on the following days and locations:

- Monday, February 3: Annex C parking lot (SW corner of the Administration Building)
- Tuesday, February 4: Heliport (NE of RDL)
- Wednesday, February 5: Greenwood Building 8100 (8100 south parking lot); LSC east parking lot; DSC south parking lot (south of DSC I).

Check recreation racks for key drop-off and pickup points. All car keys must be at the designated dropoff point by 8:30 a.m.

Riding—The next meeting of the Saddle Club will be held at 7:30 p.m. on February 4, at the recreation area.

Chess—The Chess Club will hold its next meeting from 6:30 to 9:30 p.m. on Wednesday, February 5, in the DSC snack area.

Ham radio—The Waterton Amateur Radio Society will hold its next meeting at 5 p.m. on February 4, at the Ham-

shack, located west of the recreation area.

Karate—The Japan Karate Club of Littleton meets every Wednesday and Friday from 5:30 to 7 p.m. at Maxine Williamson's School of Dance, 2539 West Main St. in Littleton. For further information, call Allan Foster, ext 1-5571, or Beverly Castor, ext 1-8559.

Bicyclers—The Mile High Rollers Velo Club will meet at 5 p.m. on Thursday, February 6, in the SSB cafeteria. For more information, call Tom Parmentier, ext 7-3717. (Velo is French for bicycle.)

Volleyball—The Martin Marietta Spring Coed Recreation Volleyball League will begin play the week of February 17. All employees, their immediate family members (dependents 18 years and over who live in the employee's home), Data Systems, and Armed Services personnel are eligible to participate. Entry forms will be available in the recreation racks. The deadline for entering the league is February 11.

Soccer—The Martin Marietta Soccer Club will form both men's and coed teams for indoor soccer leagues in February. Questionnaires and information are available in the recreation racks.



Employees complete managers' seminar

Caleb B. Hurtt, right, a senior vice president of the Corporation, and Peter B. Teets, center, president of Denver Aerospace, congratulate Robert J. Novoryta, manager, mechanical systems in special programs, for completing the new program managers' seminar. Hurtt recognized all 31 graduates of the first seminar, which trains potential and new program managers in the practical aspects of management. Hurtt's address to the group emphasized commitment to ethical practices and mission success.

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