MARTIN MARIETTA
news
ASTRONAUTICS GROUP

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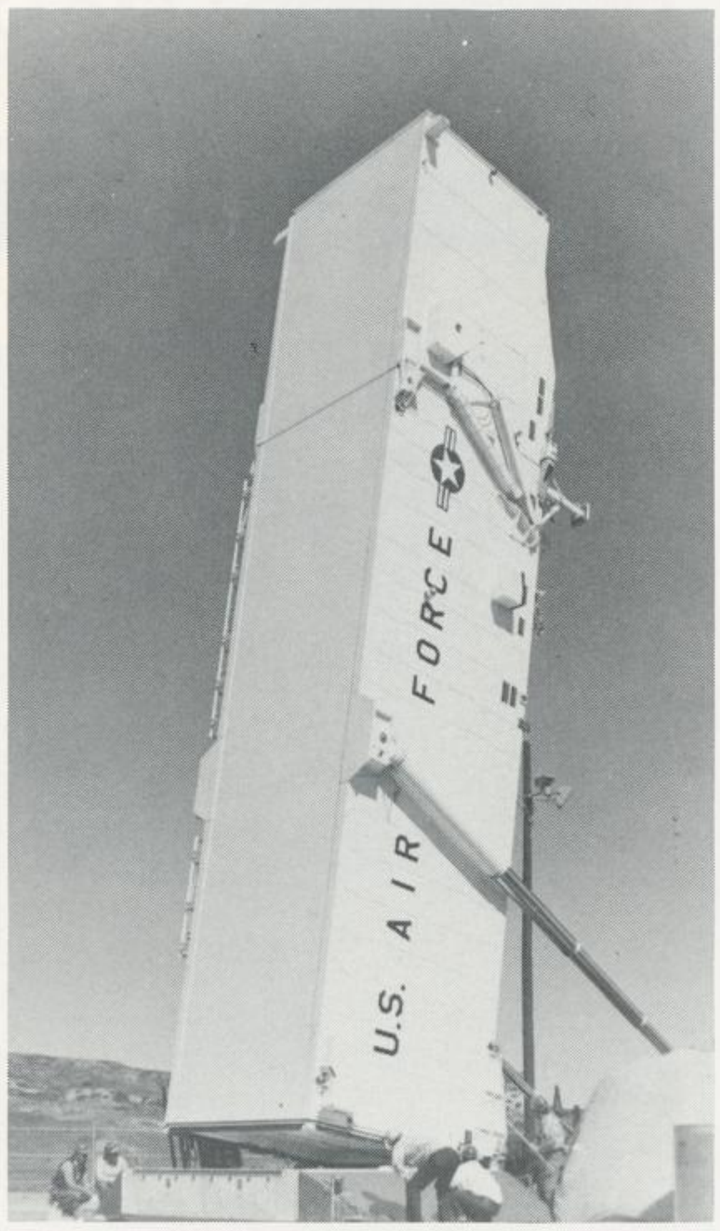
18th Peacekeeper launch successful

Successful Peacekeeper launch uses production IFSS



The above emplacer transfers the Peacekeeper from transporters into underground silos.

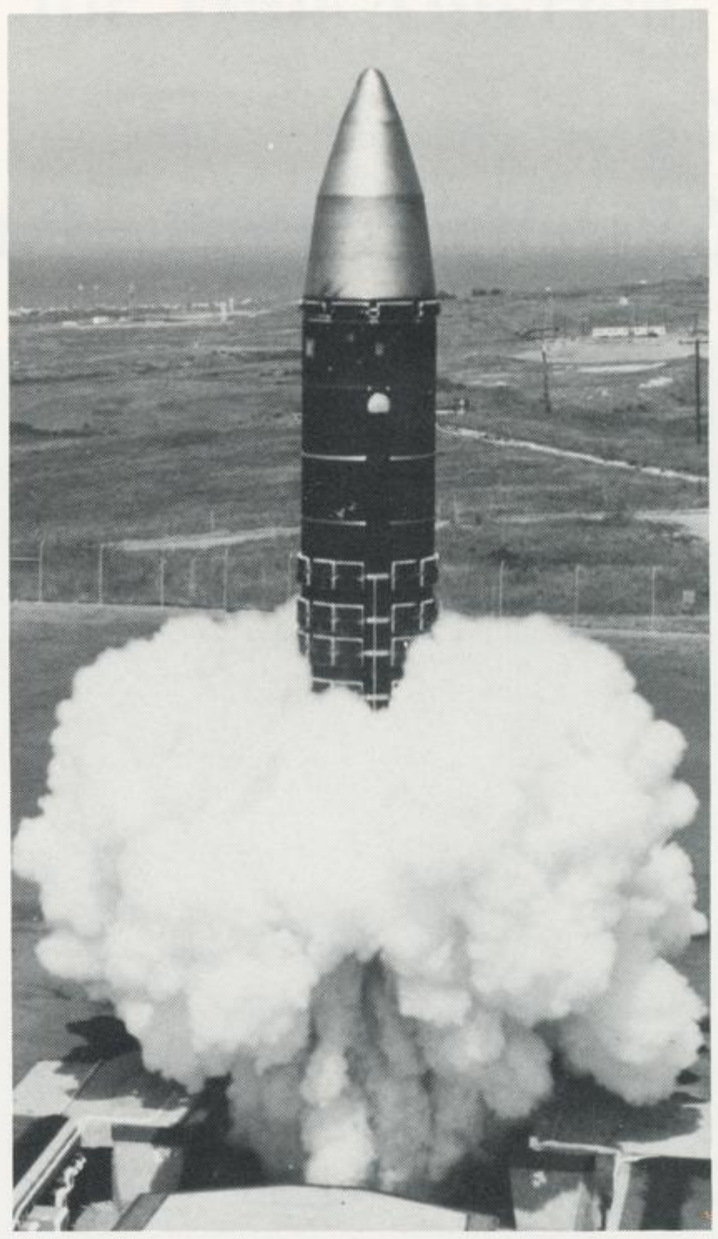
A Martin Marietta-Air Force-industry team successfully launched the 18th Peacekeeper flight test missile at 9:45 a.m. PST last Sunday from Vandenberg Air Force Base, Calif.

The missile's seven unarmed Mark 21 reentry vehicles hit the two planned target areas at the U.S. Army's Kwajalein Missile Test Range in the Pacific Ocean, some 4,100 nautical miles away, approximately 30 minutes later.

The launch command for this test flight was given from an airborne launch control center. The flight test missile carried the production version of the instrumentation and flight safety system (IFSS), which the Astronautics Group builds. The Strategic Air Command will use this version of the IFSS for follow-on flight testing.

Martin Marietta has played a major role in the Peacekeeper program. In December, the program achieved a major milestone with the on-schedule, within-budget deployment of the 50th Peacekeeper in a converted Minuteman silo at F.E. Warren AFB, Wyo. The Air Force Systems Command's Ballistic Systems Division (formerly known as BMO, or Ballistic Missile Office) at Norton AFB, Calif., is the executive management agency for Peacekeeper.

The objectives of the test include examining the missile system functional performance, weapon system performance and accuracy, weapon system reliability and the weapon system alert support systems performance. ■



Shown here during a test flight, Peacekeeper has recorded 18 straight successful flights.

Martin Marietta reports $15 million underrun to Air Force on Peacekeeper work

Martin Marietta Strategic Systems has reported a $15.2 million cost underrun to the Air Force on Peacekeeper missile system work. The underrun occurred on the Peacekeeper assembly, test and system support (AT&SS) contract.

The majority of the AT&SS work involved the highly successful Peacekeeper flight test program. Since June 1983, Martin Marietta has managed 18 flight test missile launches for the Air Force from test sites at Vandenberg Air Force Base, Calif.

The Air Force Systems Command's Ballistic Systems Division (BSD; formerly the Ballistic Missile Office, or BMO) at Norton Air Force Base, Calif., is the executive management agency for the Peacekeeper program. BSD guided and managed the Peacekeeper (formerly called the MX) system to full deployment in less than a decade.

Additional Martin Marietta AT&SS contract work included establishing the overall engineering design requirements for the missile, its assembly, testing, safety, basing, and system management. It also included designing and building transportation and handling equipment, the first two emplacers (devices for transferring missile stages from a special transporter to the silo for assembly), and instrumentation and flight safety systems for developmental flight testing.

"This has been a total team effort," said H. Edwin Sparhawk, Peacekeeper program manager for the Strategic Systems Company.

"We've put a number of Total Quality Management concepts into place on this program. One example is our cradle-to-grave, product team approach, which has shown identifiable, measurable payoffs," he said.

"Our people made a difference, too. We're fortunate that many of the same people who produced this underrun are working on follow-ons to this contract. And their follow-on work is also showing favorable trends."

The AT&SS contract value is $765 million.

Peacekeeper is this country's most successful intercontinental ballistic missile (ICBM) development program. The missile is about 71 feet long, 92 inches in diameter, and weighs approximately 195,000 pounds. More than twice as accurate as other current ICBMs, Peacekeeper can carry three times more payload, has a longer range, and has better retargeting flexibility. The system can deliver up to 10 re-entry vehicles to independent targets more than 6,000 miles away. The 50 Peacekeepers in the U.S. strategic arsenal are deployed in converted Minuteman silos at F.E. Warren Air Force Base, Wyo. ■

Air Force divisions get new names

Two Air Force divisions officially changed their names last week. The name changes, however, do not signify a change in operations, the Air Force said.

The Ballistic Missile Office located at Norton Air Force Base near San Bernardino, Calif., will be known as Ballistic Systems Division. Also, Space Division in Los Angeles will now be known as Space Systems Division.

On the cover

Peacekeeper Flight Test Missile 18 was launched last Sunday at 9:45 a.m. PST from Vandenberg AFB. This marks an 18-for-18 success rate for Peacekeeper launches.

Martin Marietta is the assembly, test, and system support contractor for Peacekeeper.

Peacekeeper history reveals story of success

The Peacekeeper—then called MX—began with a 1971 study by the Strategic Air Command (SAC). This study called for a new ICBM with capabilities that exceeded the existing Minuteman and Titan ICBM forces.

Congress approved research on the new MX in 1972, saying that the Strategic Arms Limitation Talks agreements depended on a research and development (R&D) program for strategic modernization. That R&D effort began in 1973.

By 1974, the Air Force had established an MX program office at the Space and Missile Systems Organization office at Norton AFB, Calif. At about the same time, the MX entered the concept definition phase of development.

This phase lasted until March 1976, when the Defense Science Acquisition Review Council (DSARC) reviewed the basic missile technology and basing concepts. The council decided the MX was sufficiently defined to begin the demonstration and validation phase, and ordered a go-ahead.

In the first of many basing mode decisions, the council also decided to buy the missile for initial deployment in silos, and to continue other basing mode studies.

At the second DSARC in December 1978, the members of the council agreed in principle to Air Force development of a 92-inch diameter missile, that would be deployed in multiple vertical shelters.

They also asked the Air Force to study an air mobile system, as well as other basing alternatives. Ultimately, more than 30 basing modes were explored.

In June 1979, President Jimmy Carter approved full-scale engineering development of the MX, but held off on the basing decision. Then, in September, he announced that he had selected a sheltered road mobile basing mode. In October 1979, the Ballistic Missile Office (BMO) at Norton AFB, Calif., took over management responsibility of the MX for the Air Force.

But strong political opposition to sheltered road mobile basing, which came to be known as the "racetrack," developed in the areas proposed for deployment. This opposition led President Ronald Reagan to cancel this basing mode in October 1981.

Shortly thereafter, President Reagan said he supported basing the missiles in closely-spaced shelters. This basing mode, called "dense-pack" basing, experienced opposition from Congress.

To help build support for the MX, President Reagan renamed it the Peacekeeper on Nov. 22, 1982. But the debate over basing—and the need for strategic forces modernization in general—continued.

In a move aimed at achieving a national consensus, President Reagan created the President's Commission on Strategic Forces in January 1983. Lt. Gen. Brent Scowcroft was chosen to head the commission, which issued its report in April 1983. Its recommendations:

— Deploy 100 Peacekeeper missiles immediately in Minuteman silos as a way to modernize the U.S. land-based ICBM force in the near term, and to help reduce the Soviet imbalance in large ICBMs;
— Develop a small, single-warhead ICBM; and
— Seek new arms agreements with the Soviet Union.

The President endorsed these recommendations later that month—including basing 100 Peacekeeper missiles in Minuteman silos at F.E. Warren AFB in southeastern Wyoming.

Congress, in September 1983, set the Initial Operational Capability requirement for Peacekeeper-in-Minuteman-silos (PIMS) at 10 missiles in 1986. While political battles raged, Peacekeeper development continued. A simulated Peacekeeper was launched from a protective canister at Jackass Flats, Nev., in January 1982. This launch confirmed for Peacekeeper the viability of the "cold launch" concept.

The Air Force activated Detachment 1, BMO, at Warren AFB, in January 1983. Its task: Plan and coordinate construction, assembly, check-out and transfer of Minuteman III silos for Peacekeeper missiles.

Peacekeeper Flight Test Missile One (FTM-1) was launched successfully from Vandenberg Air Force Base, Calif., on June 17, 1983. Its inert reentry system splashed down in the planned target area near Kwajalein Island in the Pacific Ocean, some 4,100 miles away.

Meanwhile, just three days earlier, U.S. Air Force Headquarters had directed BMO to begin formal, full-scale development of PIMS.

Although Peacekeeper production began in February 1984, the basing question was not finally resolved until July 1985. A House-Senate conference committee reached an agreement limiting Peacekeeper deployment to 50 missiles housed in Minuteman silos.

Following the successful flight tests that began in 1983, Peacekeeper flight testing continued at Vandenberg AFB in 1984 with flights four through six. Flights seven through 10 took place in 1985. Flight nine (FTM-9), on August 23, 1985, was not only the first Peacekeeper launched from a silo, it was the first silo-based cold launch of an ICBM in the Free World.

Flight tests 11 through 15 took place in 1986, and tests 16 and 17 in 1987. Missile 18 was launched last Sunday.

While flight testing continued at Vandenberg, the pace of activities at Warren AFB stepped up. Equipment and methodologies were perfected at Vandenberg AFB for modifying Minuteman silos, emplacing Peacekeeper missiles in them, and launching the missiles. These technologies then were transferred to the deployment site at Warren AFB.

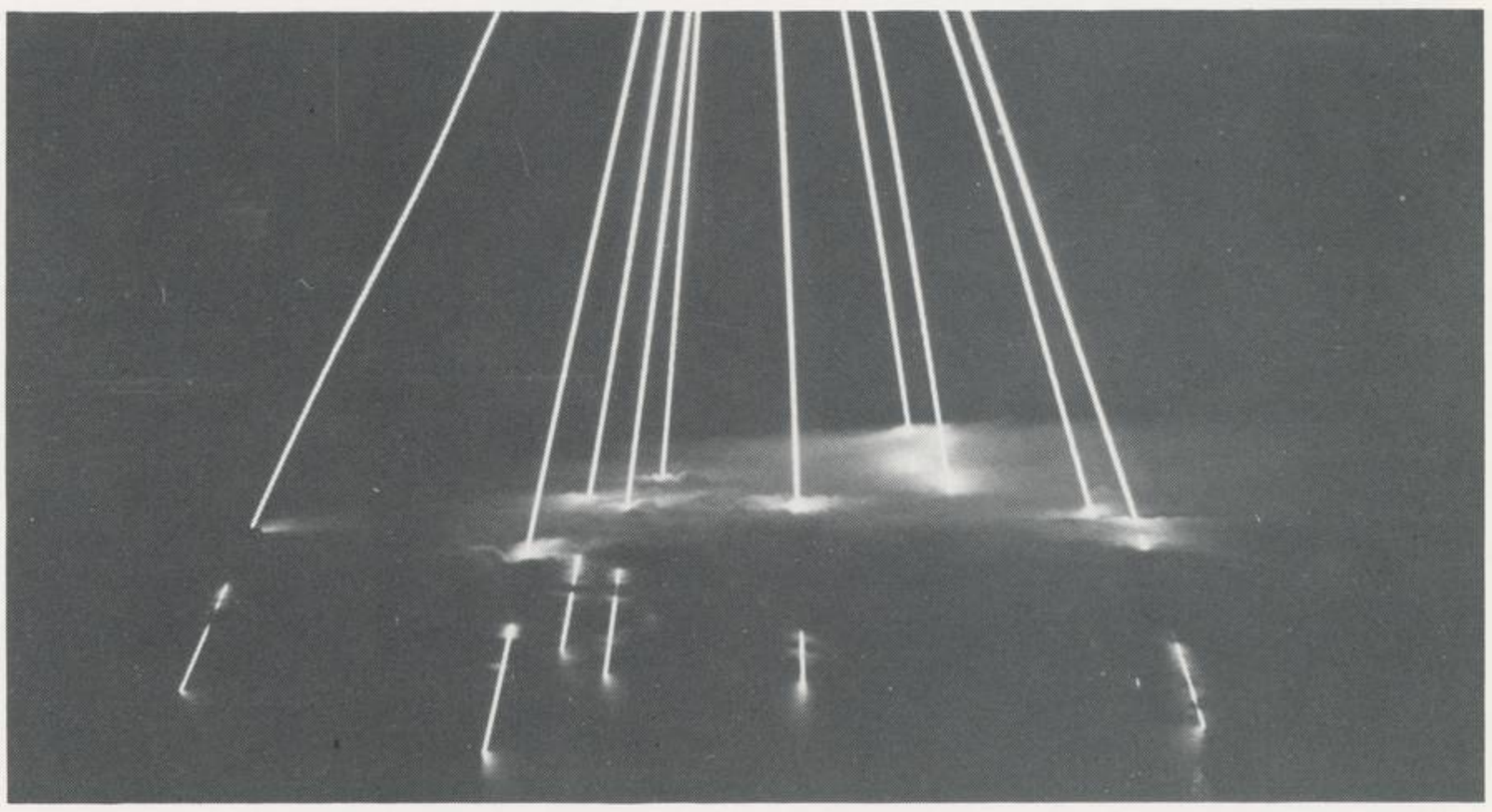
On Dec. 22, 1986, Initial Operational Capability for the Peacekeeper ICBM system was reached at Warren AFB. Ten missiles had been placed in silos, capable of going on operational alert.

During the next two years, thousands of components and assemblies that make up the Peacekeeper system were manufactured, assembled and shipped to Warren AFB. There they were staged, processed and finally assembled. Forty more Minuteman III launch facilities and four more launch control complexes were converted to Peacekeeper configuration and brought on line, in addition to training and other operational support facilities.

And on Dec. 16, 1988, the 50th Peacekeeper missile based in a modified Minuteman III silo was turned over to the SAC.

Nine-and-a-half years had elapsed since the decision to begin full-scale engineering development on Peacekeeper. Only five-and-a-half years had elapsed since Peacekeeper-in-Minutman-silos went to full-scale engineering development. But the Peacekeepers were ready—ready to fulfill their frontline role in the land-based leg of the U.S. Strategic Triad.

By Steve Frank



Re-entry

Ten Peacekeeper re-entry vehicles re-enter the atmosphere for splashdown at planned target areas near Kwajalein Island in the Pacific Ocean.

Augustine visits Deer Creek

Norman R. Augustine, chairman and chief executive officer, left, examines a quarter-scale model of the Magellan spacecraft in the lobby of the Deer Creek Facility with Joseph C. Spencer, vice president for Business Development, center, and Stanley F. Albrecht, vice president for Plant Operations. Augustine visited Denver earlier this month to review some of the Astronautics Group's programs. While here, he also met with Edward M. Browne, president of Commercial Titan, Inc., and his entire staff to discuss the progress the company is making this year in marketing the Commercial Titan launch vehicle.

Savings bonds campaign to start

The 1989 U.S. Savings Bonds campaign begins at the Astronautics Group Monday, March 27, and Joseph C. Spencer, vice president of Business Development and Astronautics Group chairman for the campaign, is urging all employees to participate.

Astronautics Group President, Peter B. Teets is the 1989 Savings Bonds Campaign chairman for the Denver area.

"Savings bonds are an important source of funding for our government's operations and provide an attractive personal savings alternative for the public, particularly considering today's uncertain economic conditions," Teets said.

Last year, 95 percent of Astronautics Group employees supported the campaign. Moreover, Americans invested more than $7.2 billion in U.S. Savings Bonds and the value of the bonds outstanding climbed to nearly $107 billion."

More than 23 million American families -- or about one in three --own savings bonds," Teets said. "These numbers are a remarkable measure of the popularity of savings bonds."

The United States savings bond is currently the most widely held security in the world.

Through the payroll deduction plan, savings bonds are easy to purchase, and they represent a good, safe, affordable investment, Spencer said.

"We had great support for the program last year," he said. "Our goals for 1989 are to again achieve 95 percent. We are currently at 83 percent." ■

Space Systems participates in space science missions

Space Systems is participating in a series of missions this year that will return the United States to active planetary exploration.

The first and most visible of these, of course, is Magellan, which is being readied now in Florida for an April 28 Space Shuttle launch to Venus to map the planet in great detail. More than 120 Space Systems employees have been in Florida since last fall preparing Magellan for launch, and a team of people will be tracking its progress during the 15-month, 700 million mile journey to Venus.

Magellan will be the first planetary mission the U.S. has launched in more than eleven years. In August of this year, NASA will hear from one of the last planetary spacecraft launched --the Voyager II, which will fly by and provide images of Neptune, the mysterious eighth planet in our solar system.

Voyager II, launched in August 1977, and its sister satellite, Voyager I, launched a month later (both by Martin Marietta Titan launch vehicles), have been providing glimpses of our outer planets. Voyager I visited Jupiter and Saturn and is now headed out of the solar system.

Voyager II flew by Jupiter in 1979, Saturn in 1981 and Uranus in 1986. It is scheduled to sweep within 3,000 miles of Neptune's cloud tops on August 24, providing a glimpse of the giant, gaseous planet. Equipped with a variety of cameras and sensors, Voyager II will beam back to Earth the world's first close-up views of Neptune. Space Systems built several components for both Voyager spacecraft, including composite truss structures, electronics, and elements of the propulsion system.

In October, NASA will launch the Galileo spacecraft to probe the mysteries of another planet: giant Jupiter, sixth planet from the sun. Galileo will embark on a six-year, $2.4 billion trip to Jupiter, using an attitude and articulation system built by Space Systems to maintain Galileo's orientation during the flight and for orbital maneuvers around the planet. About five months before Galileo reaches Jupiter, a small probe will separate from the orbiter spacecraft and begin a descent through the Jovian atmosphere.

In December 1995, the four-foot diameter probe will deploy a parachute and plunge through the atmosphere, collecting information for 75 minutes until it is crushed by atmospheric pressure. The probe will perform the first sampling of Jupiter's atmosphere, which scientists believe to consist primarily of ammonia, the original material from which stars are formed. Space Systems built three of the probe's six instruments, which will measure temperature, pressure, cloud particles and amount of solar energy.

After the probe relays its data back to the orbiter, the orbiter will continue to circle Jupiter for 20 months, flying a series of ever-changing elliptical paths, using nine scientific instruments to study the physical properties of Jupiter and its moons.

In December, NASA will again reach for the outer galaxies when it launches the Hubble Space Telescope, the world's largest orbiting telescope. Freed from the interference of the Earth's atmosphere, the powerful telescope will provide scientists with the clearest picture yet of the universe. One of five scientific instruments onboard the telescope will be Space Systems' Faint Object Spectrograph.

The spectrograph will detect and analyze light sources in the universe so faint they cannot be seen by an ordinary telescope. With the spectrograph, the telescope will be able to observe objects about 50 to 100 times fainter than currently can be seen by the most powerful Earth-based telescope. It may provide clues about the origins of our universe --how big it is, how old it is, its evolution and its ultimate fate.

By Jeff Fister

Students entertain

Members of the Smoky Hill High School Fine Arts Department entertained employees at the Deer Creek Facility cafeteria recently as part of Colorado Arts Education Month. Students from Smoky Hill performed excerpts of Rogers and Hammerstein's "Oklahoma," and the school's jazz ensemble performed. Martin Marietta's involvement continues Saturday, March 25, with a free day for employees at the Denver Art Museum.

Museum to sponsor day for employees

In conjunction with Colorado Arts Education Month, the Denver Art Museum is sponsoring a free day for employees Saturday, March 25.

Employees and their families will get into the museum free by showing their Martin Marietta badges. In addition, coffee and donuts will be provided in a room near the lobby.

The museum is currently presenting "Toulouse-Lautrec's Paris: The Baldwin Collection," which features more than 90 graphic images by Henri de Toulouse-Lautrec depicting the inner city of Paris at the end of the 19th century.

The Baldwin Collection, donated to the San Diego Museum of Art in early 1988, is one of the most extensive Lautrec collections in the United States and one of very few to include a complete set of Lautrec's celebrated "Elles" series.

The museum will be open from 10 a.m. to 5 p.m. and is located at 100 W. 14th Avenue Parkway. Employees may park in metered spots or behind the museum between Acoma and Bannock streets. ■

Corporate news

Martin Marietta to develop computers that 'learn'

Martin Marietta Corporation has been selected by the U.S. Air Force to develop a neural network computer system to enable robots to perform tasks on their own.

Neural network computers, modeled after the human brain, consist of large numbers of interlinked processors that work together to allow the computer to "learn" and "reason" without complex external programming.

Under a 39-month contract, Martin Marietta Aero & Naval Systems at Baltimore will develop a neural control system for use by the Avionics Laboratory at Wright-Patterson Air Force Base, Ohio. It will be installed on two Martin Marietta-built test beds—a high-performance robotic arm modeled after a human arm and an industrial robot resembling a forklift.

The robotic arm will be designed to learn a difficult tracking maneuver requiring precise coordination. A scanning laser system will generate a moving light spot that the robot will track with another laser. Successful tracking will require the robot to learn to coordinate its laser "vision" with smooth, accurate mechanical movements.

The industrial robot will learn to use a variety of sensors, including optics and sonar, to determine the location and orientation of objects it will be required to lift and move.

The neural network control system will be based on a mathematical model of the way humans learn and forget. ■

Space Systems wins Mars rover contract

Space Systems has won a contract to study a robotic space mission to explore the surface of Mars and return soil samples for analysis on Earth.

The $1 million, 13-month study contract was awarded by the National Aeronautics and Space Administration's (NASA) Johnson Space Center in Houston, Texas. Called the Delivery and Return Study, the study is part of NASA's work on a Mars Rover/Sample Return mission planned for launch in the late 1990s. TRW also received a parallel study contract.

"We're excited to be actively engaged in future exploration of Mars," said Bill Woodis, Space Systems Mars Rover/Sample Return manager. "The Mars rover mission will be a logical precursor to manned missions to the red planet in the next century."

Under the contract, Martin Marietta will study requirements and spacecraft designs for major portions of the mission. The mission involves launching several spacecraft to Mars, including two orbiters and two landers. One lander would descend to the Martian surface, carrying a robot rover that would traverse the surface, picking up samples along the way. The other lander would contain the ascent spacecraft. The rover would bring samples to the ascent vehicle, which would rocket them back to the orbiting spacecraft. The samples then would be transferred to another vehicle for return to Earth.

Terry Gamber is Space Systems study manager for the program.

Prior to this study, Martin Marietta was under contract to the Johnson Space Center to study how a space vehicle would be captured into Mars orbit, descend through the Martian atmosphere, and autonomously perform safe landing at a preselected site. Also, under a separate contract with NASA's Jet Propulsion Laboratory, the company is studying rover vehicles needed for the mission.

Martin Marietta also built for NASA the twin Viking Mars landers, which in 1976 provided the world with the first views of the planet's surface.

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Martin Marietta donates to HOPE

John Stap, vice president of the Southern Region for Martin Marietta, right, reviews the blueprints for the new HOPE Place shelter for women and children with Ellie Lienau, president of the board of HOPE Place, and Norma Harwood, the shelter's director. Martin Marietta donated $10,000 to the shelter in Huntsville, Ala., to help pay for construction of a new facility scheduled for occupancy this summer. HOPE Place has provided safe shelter to 851 women and 1,089 children since its opening in 1981.

Volunteers needed for WalkAmerica

Martin Marietta employees are polishing their sneakers for WalkAmerica/Teamwalk on Saturday, April 29, for the March of Dimes and the prevention of birth defects.

Last year, TeamWalk attracted 150 Colorado companies representing more than 2,700 employees, their families, and friends. Together, they raised more than $250,000 for the March of Dimes.

This year, Martin Marietta participants plan to meet at one of the 13 walk locations for a total team effort.

"The word throughout town is that TeamWalk is one of the most rewarding and fun-filled days around and it's great for the entire family," said Debbie Smith, Martin Marietta TeamWalk captain. "We expect to make a terrific showing our first time out because we want to help increase the chance of a healthy birth for every baby."

Participation in TeamWalk is voluntary, and Smith said Martin Marietta actively supports and encourages employees to join the team.

"We are encouraging our employees to get involved to help Martin Marietta have the largest corporate team," Smith said.

Additional details, and sponsor forms, are available through Smith at Ext. 7-5364. ■

Employee services/recreation

Colorado Corporate Games—Martin Marietta employees are urged to try out for the company's ninth Annual Corporate Games team. The competition involves more than 30 corporations and is a fund-raising event for the Colorado Special Olympics. Men and women are needed for track, tennis, racquetball, swimming, bicycle, golf, trap shooting, 5k run, 5k racewalk and 5k wheelchair competitions. Bowling participants were selected from the masters qualifying tournament in January. Volleyball team members will be selected from the current coed competitive league. Events that will pair employees with special olympians include a tandem bicycle race, a 4x100 meter track relay and a 4x25 meter coed freestyle swimming relay. Employees interested in participating as athletes or volunteers can get a Corporate Games flyer from the recreation racks beginning March 31. Completed forms should be returned to the Employee Services/Recreation office before April 7.

Running Club—The Sheepherders Running Club begins a spring race series in Waterton Canyon, Thursday, March 30. Other race dates are April 13 and 27, and May 11 and 25. All races start between 4:45-5 p.m. For information, contact Brad Eckhoff, Ext. 7-7102 or 7-1496.

Photography Club—Platte Canyon Photography Club members will meet at 7 p.m. Monday, March 27, at the Public Service Building, 10001 W. Hampden Ave. Prospective members are welcome. For information, contact Bill Privratsky, Ext. 7-4969.

Mile High L5 Space Society—The group will meet at 7 p.m., Monday, April 3, at the Public Service building (northwest corner of Kipling and Hampden).

Saddle Club—Ridgeriders Club members will meet at 7 p.m. Tuesday, April 4, in the clubhouse at the recreation area. For information, contact Mary Smith, Ext. 1-8154, or Joe Carroll, Ext. 1-7800.

Aerorider Motorcycle Club—The group will meet at 5 p.m. Thursday, April 6, in the clubhouse at the recreation area. For information, contact Paul Betthauser at Ext. 1-5574.

Satellite Ski Club—The race team took first place overall in the ski club division of the "Teamski" race series March 5 at A-Basin—winning the Henderson Cup Trophy for the fifth time in eight years. Cross-country trips are planned March 25 to Mayflower Gulch, contact Frank Farrell, Ext. 1-1576; and April 1 to Shrine Pass, contact Steve Ahmann, Ext. 7-4397. The annual Fun Day is Sunday, April 9, at Loveland. Enjoy free lunch and timed racing, prizes, and games. Lift tickets are only $12. Contact Doug Banning, Ext. 7-5581. The next meeting will be at 7 p.m. Wednesday, April 12, at the Peachtree Two clubhouse.

Ice Capade Ticket Discount—Employees can save $3 on $12 and $10 tickets for the 7:30 p.m. performances on April 12, 13 and 14, and the 6 p.m. show on April 16. Mail order forms can be found in the Employee Services/Recreation racks and must be returned to the specified address four days prior to the designated performance.

Softball leagues forming—The following meetings are scheduled for the upcoming softball season: the Coed League (Monday and Friday nights) Monday, April 3; the Open League (Tuesday and Thursday nights) on Tuesday, April 4; and the Competitive League (Wednesday night) on Wednesday, April 5. All meetings begin at 5 p.m. in the Deer Creek cafeteria—located on the "A" level, north end. Teams from 1988 will be given space priority if they submit a roster with payment by April 11. The final deadline for receipt of all rosters to the Employee Services/Recreation office is April 20. All team captains and interested employees should attend the organizational meetings. Rosters will be available in the recreation racks by March 29. All rosters must be submitted with a minimum of 10 players and $10 per player.