

MARTIN MARIETTA

news

DENVER AEROSPACE

NUMBER 2/1984

Mission STS 11/41B
Crew



First space test of MMU slated for this month's shuttle flight

For the first time astronauts will venture untethered into space next week thanks to a unique backpack propulsion device, the Manned Maneuvering Unit (MMU).

The initial space test of two MMUs, by Bruce McCandless then Robert Stewart, is scheduled for the fifth day (February 7) of the 10th Space Shuttle (STS-11/41B) flight scheduled for launch earlier today.

Two days later (February 9), and the seventh day of the orbiter Challenger's mission, another four-hour test is scheduled.

During each test, McCandless and Stewart will separately practice various maneuvers used to rescue and repair the disabled Solar Maximum Mission Observatory satellite (Solar Max). The actual rescue mission will be done by astronauts George Nelson and James van Hoften during April's subsequent Space Shuttle flight (STS-13/41C). They will dock with Solar Max to stop its spinning. The remote manipulator arm will take it into the Space Shuttle's cargo bay for repairs.

During the first extravehicular activity (EVA), McCandless will perform untethered familiarization flights within the confines of the cargo bay, followed by longer-range flights of 150 to 300 ft outside the orbiter.

Challenger's mission

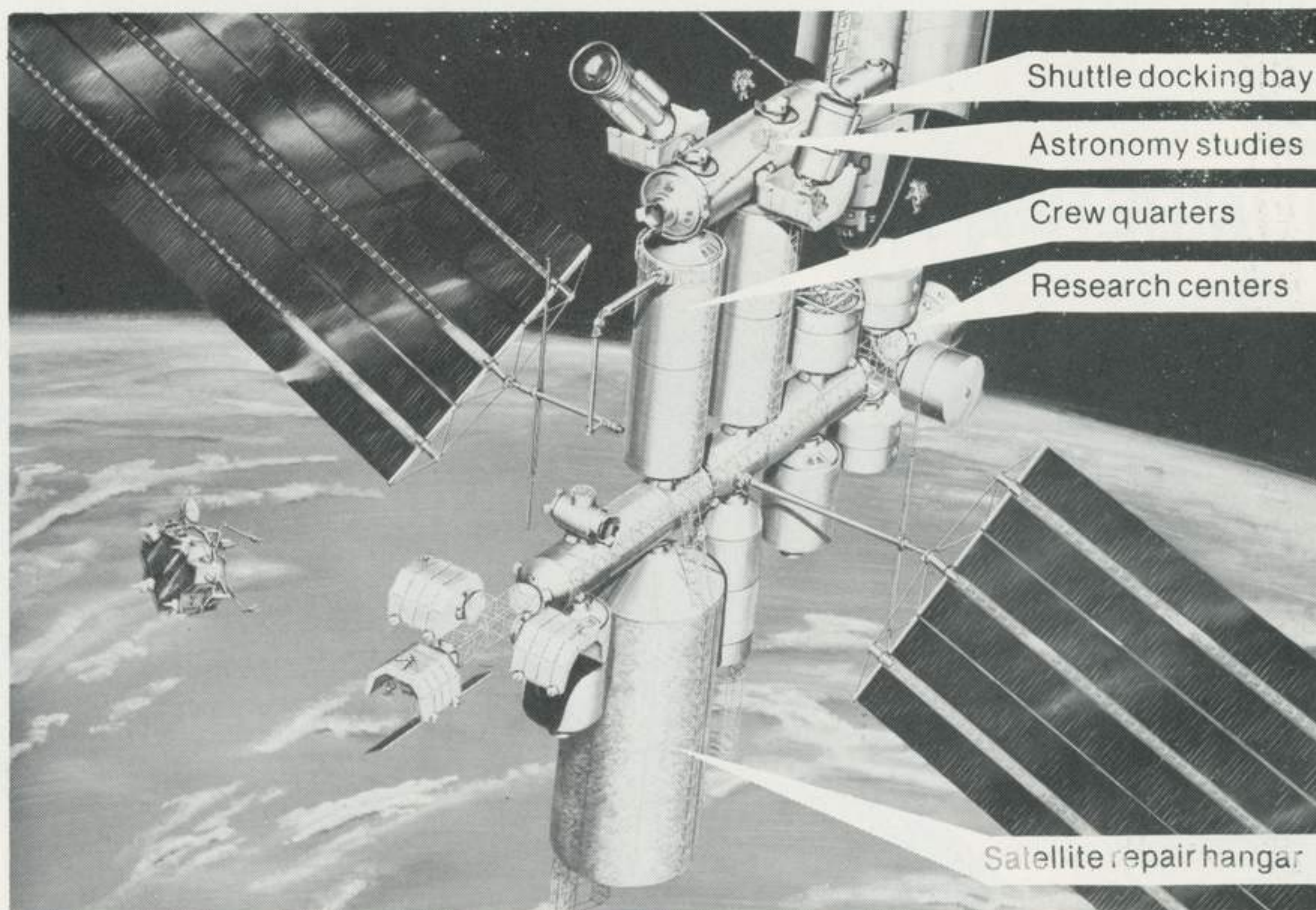
On Space Shuttle mission STS-11/41B, scheduled for launch earlier today, astronauts will perform the first untethered spacewalks using Manned Maneuvering Units (MMUs) (highlight of the mission) developed by Martin Marietta, launch two commercial communications satellites, and perform a series of rendezvous maneuvers using an inflatable balloon as a target.

The orbiter Challenger, making its fourth trip into space, was to lift off from Kennedy Space Center in Florida and is scheduled to land there eight days later, February 11.

The five-man crew is led by Commander Vance Brand, a Longmont native and graduate of the University of Colorado, who will be joined by pilot Robert "Hoot" Gibson and three mission specialists—Bruce McCandless, Ronald McNair and Robert Stewart.

The second EVA will allow each MMU-equipped astronaut to attempt to dock with a Shuttle pallet satellite slowly rotating at the end of the remote manipulator arm. Engineering evaluation of the MMUs and tests of a special hydrazine transfer tool proposed for later satellite servicing also are scheduled for the second EVA.

McCandless and Stewart will then take turns checking out some of the equipment needed to perform the Solar Max



President Reagan, in his recent State of the Union message, told NASA to develop a permanently manned space station in cooperation with allied nations, similar to the one pictured here. That artist's concept appeared the following day (January 26) on the front page of USA Today, the new national morning newspaper. The picture also earned Denver Aerospace 11-year veteran artist, John Tieleman, a "best of show" and an award of excellence in the paintings (technical renderings) category of the recent regional Society for Technical Communication competition. His artwork is entered in the Washington D.C.-based professional group's national honors to be chosen in the spring. Two other company artists also are in the national competition after winning awards for excellence. Robert Murray won for his layout of the company's Transfer Orbit Stage (TOS) brochure. William Mitchell won for an original Orbital Maneuvering Vehicle (OMV) painting in the presentation art category.

repair mission, including a special foot restraint that fixes onto the end of the Challenger's remote manipulator arm and a portable docking device that will allow an MMU-equipped astronaut to dock with and stabilize Solar Max in space.

NASA has adopted the MMU as standard Shuttle equipment. Eventually the unit is expected to enable astronauts to perform a variety of activities outside an orbiting spacecraft including satellite servicing and repair, science investigations, and construction of space station elements.

The unit is propelled by 24 nitrogen gas jets, that the astronaut operates by hand controls at the ends of the unit's arms. It weighs 338 pounds on Earth but is weightless in space.

Astronauts will be able to perform sophisticated tasks that require mobility (essential to physical labor and scientific experiments in space) they did not have before the MMU.

Martin Marietta has been developing MMU-type backpacks for NASA since the early 1970s. An early model was used by five astronauts inside the Skylab space station during 1973 and 1974.

The NASA astronauts have been training more than a year on the company's space operations simulator preparing for this first MMU venture into space and the ultimate rescue of Solar Max.

On the cover

The crew of the Space Shuttle, which was scheduled for launch earlier today, recently posed for this photograph at Houston's Johnson Space Center. In the front row, left, is Vance D. Brand, commander, and Robert L. Gibson, pilot. Mission specialists are: (left to right) Robert L. Stewart, Dr. Ronald E. McNair, and Bruce McCandless II. Stewart and McCandless are wearing extravehicular mobility unit (EMU) spacesuits. This mission will see two extravehicular activities (EVAs), using the manned maneuvering unit (MMU) developed by Denver Aerospace, as rehearsals for a scheduled repair visit to the Solar Maximum Observatory Satellite on the next mission in April.

Augustine's annual report available to employee groups in video, film

President Norman R. Augustine's annual report to employees "1983, The Year in Review," is available in video cassette and 16-mm film to employee groups. Contact Public Relations, ext 5364.

Electrical engineer becomes snowstorm 'good samaritan'



'Samaritan,' son, and Bronco

What do a pheasant hunter, three dogs, a baby, and about a dozen other people have in common?

All were good will beneficiaries of Dale Callahan on his way home to Denver from a hunting trip during the immediate post-Thanksgiving blizzard.

The electrical engineer on special programs at Denver Aerospace was traveling Interstate Highway 76 about midday that Sunday when he first encountered stranded travelers. Neither he nor another four-wheel-drive vehicle operator could free the snowbound motorists or fix their mechanical problems.

Callahan invited them into the warmth of his Bronco (which he had been towing behind a camper) as the next best alternative. The refuge seekers then moved into that camper as their number increased eventually to 13 persons and three dogs, all munching sandwiches dished up by him and his 15-year-old son, Eddy.

But Callahan's kindness didn't end at 7 p.m. when snowplows arrived to dig out vehicles. Those that could continue went on. But not everyone went on, according to Stan Prokop, a rescue beneficiary who works for Integrated Electronics.

"Dale delivered each person (in the camper) to their own front door back in the Denver area. Talk about somebody who's nice... Everybody was so grateful. It really was a lifesaver," said Prokop, who had been enroute home from pheasant hunting in Nebraska with his wife and 3-month-old baby when car problems arose. They were stranded without heat in their car for two hours before Callahan arrived.

Callahan's reaction to his "Good Samaritan" role?

"Anyone would have done the same thing. I happened to have the equipment that could handle it."

Federal, state tax forms available

Internal Revenue Service and Colorado state income tax filling forms for 1983 are now available to employees at various Denver Aerospace locations.

Contacts for those forms are:

- Main plant: Recreation/Employee Service office, Eng module 124G;
- SSB: Sandra Mitchell, module 409;
- DSC II: Kay Shuey, module 50G;
- LSC: Allen Bill, module 108;
- SLF: Lucy Winka, Personnel Office representative;
- Greenwood Commons: Betty Baker, Bldg 8100, second floor;
- Inverness: Maree Lazzaro, Personnel Office.

Employees to examine public school science education

A panel of educators, administrators, and parents will get an industrial perspective evaluation on the state of science teaching in Denver public schools from two members of the payloads, sensors, and instruments section.

Lyle E. Bergquist and Stephen M. Pompea have been chosen to serve on a select committee that will examine science education in Denver, the United States, Japan, and Western Europe. The group will followup with recommended curriculum revisions, as necessary, to enhance the quality of science education locally.

Bergquist has been an advisor to the Jefferson County Public Schools Science Program, and served on that group's curriculum coordinating committee and its science audit team.

Before joining Martin Marietta, Pompea taught physics, astronomy, and Earth sciences at both secondary and collegiate levels. He was named an Outstanding Science Teacher of Colorado by the Colorado Science Teachers Association.

Credit Union earns highest possible grade

Red Rocks Federal Credit Union earned an "excellent" grade during its annual federal examination in January, the highest possible rating. Last year the credit union received a "very good" grade, indicating steady growth and improvement.

Meanwhile, Red Rocks announced it has a new type of loan available to members. In cooperation with the Waterton Computer Club, loans at 13.5 percent interest are being made available to Credit Union members to buy personal computers. Up to \$4000 may be borrowed, and payroll deduction is encouraged for easy payments. Terms favor computers bought through the Computer Club. Contact the Credit Union and club for details.

Dividends for the fourth quarter of 1983 have been announced by the Credit Union board of directors. Dividends will range from 6.5 percent for regular share accounts with balances up to \$1000 to 9.0 percent for that portion of the balance above \$5005.

The board of directors recently announced several new appointments. Wilbur Benham was appointed to the board, while Margaret Condon was appointed chairman of the education committee. Volunteers are being sought for a vacancy on the board. Contact the Credit Union, ext 6000 for details.



Employees at Denver Aerospace made personal contributions totaling \$580,000 to the 1983 United Way campaign. That figure computes to a per capita contribution of \$78, based on the 8713 onsite employees. The company also made a corporate contribution of \$80,000. Dominic Verrastro (right), manager of employee and labor relations, presented the company's check to Bill Miller, Denver Water Board and last year's United Way volunteer general campaign chairman at a recent luncheon to honor employee volunteer coordinators. Also pictured is Fitzroy Newsum, public relations, who is a member of the United Way Board of trustees and chairman of the organization's regional publicity subcommittee.

Something missing?

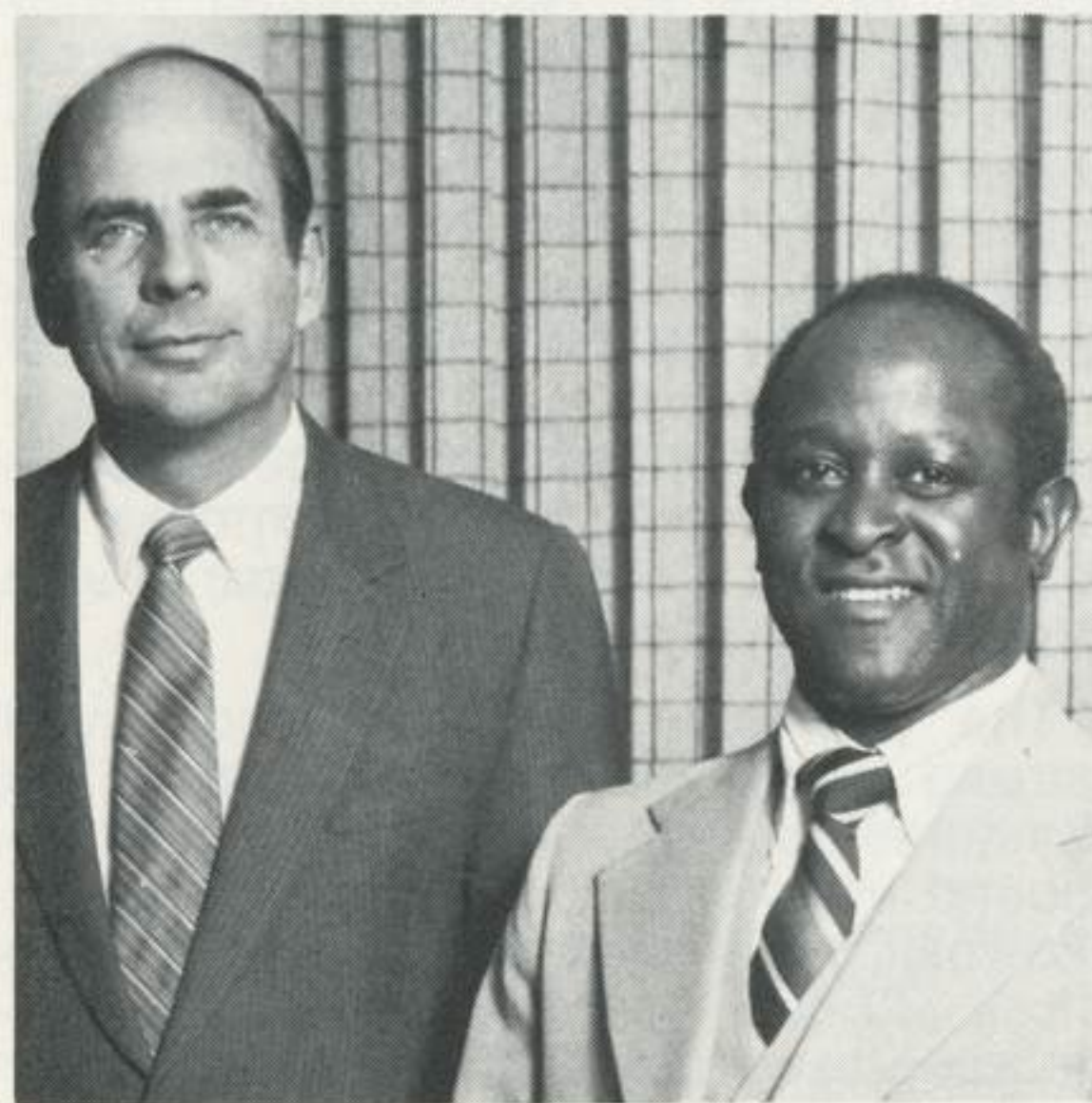
Plant Protection reports a large number of items remain unclaimed in the lost-and-found department at the main plant. Employees are encouraged to call ext 4646 to check the firehouse for missing articles.



David Thompson, president of Orbital Sciences Corporation (OSC), recently got a workout on the manned maneuvering unit (MMU) simulator during a recent visit the main plant. Denver Aerospace is currently involved in a full-scale development contract for OSC's transfer orbit stage (TOS). TOS is a space propulsion vehicle that will boost satellites from the Space Shuttle's standard low-Earth orbit to elliptical high-altitude orbits and planetary escape trajectories. It is being designed to provide economical access to space for commercial and government programs. The company also is preparing a study for an apogee and maneuvering system for atop the TOS.

Preferred dividend declared

Martin Marietta Corporation's Board of Directors authorized a quarterly cash dividend of \$1.2188 per share on the \$4.875 Convertible Exchange Preferred Stock. The dividend is payable March 15 to holders of record at the close of business February 13.



Frank Davis, test department (right), is the latest winner of the "Project Referral" drawing for a trip to Florida to witness a future Space Shuttle launch. The company has received about 1000 resumes since November when the concerted hiring program was initiated. Pictured with Davis is Norman R. Augustine, president of Denver Aerospace.

Company to evaluate defense vs laser weapons

Denver Aerospace has embarked on a \$1.8-million program that is considered a key element affecting the government's eventual decision on deployment of space-based lasers.

The 4 1/2-year contract from McDonnell Douglas Astronautics Company will be to assist in the evaluation of techniques to protect land- and sea-based strategic missiles from high-powered laser systems. The laser-hardened liquid propellant bal-

listic missiles program will be conducted for the Air Force Materials Laboratory at Wright-Patterson Air Force Base, OH.

Richard C. Rozycki of Engineering Mechanics is the program manager.

The company's responsibilities include designing and building a large-scale test article for demonstration under actual laser beam testing. Also included is design integration of protective schemes into representative missile configurations.

Rauth chair endowed at Drexel University

The J. Donald Rauth endowed chair in management was established formally by Philadelphia's Drexel University to honor the 1940 engineering graduate and former Martin Marietta president, chief executive officer, and board chairman. He continues as a member of the Corporation's board of directors.

The chair was endowed by a \$750,000 grant from the Corporation.

Drexel's president, Dr. William H. Hagerly, said in a letter to Thomas G. Pownall, Martin Marietta board chairman, "Your company's generous support of higher education is a matter of record. You are enlarging on this tradition by honoring a man of Don Rauth's distinction. You are providing a fitting tribute to a man of exceptional character and achievement, and at the same time adding a major dimension to Drexel's College of Business Administration."

Rauth received an honorary doctorate in engineering from Drexel the same year he joined the university's board of trustees, 1964. He had been chairman of Drexel's board since 1980.

External tank arrived at KSC

The external tank for the 13th Space Shuttle mission, one of ten Denver Aerospace plans to deliver this year, recently arrived at NASA's John F. Kennedy Space Center (KSC) in Florida.

The tank, scheduled to be used on a July 1984 flight, joins four others currently inside the space center's vehicle assembly building being prepared for future Shuttle launches.

Three at Michoud named industrial hygienists

Three Michoud safety department members recently joined an exclusive group of 2000 nationwide—only three others within the Corporation itself—by fulfilling stringent requirements for certification as industrial hygienists.

Dr. Monty L. Herr and Roy J. Rando passed the written examination and comprehensive practice requirements that qualified them as certified industrial hygienists. Kevin J. Grice passed the written examination for certification as an industrial hygienist in training.

Industrial hygienists monitor equipment that measures safe levels of noise, toxic chemicals, and acceptable levels of radiation.



The company's first "hands-on learning" sessions in Ada, began last week. The new computer programming language, destined to replace the hundreds currently used in defense work, was chosen by the Department of Defense (DOD) for all mission-critical applications and embedded computer systems where the computer provides exclusive support for the overall system in which it operates. Ada is also the registered DOD trademark for the language. The company plans to be training its personnel at the rate of 200 a year during the next three- to four-year period. Each 13-week class, involves a five-day-a-week, eight-hour-a-day program. The second round of classes is scheduled to begin April 2.

Kronauer to head company's 'Commitment to Excellence'

Clifford J. Kronauer, who comes from a similar position with General Electric (GE) Company's Space Systems Division, has been named to head Denver Aerospace's "Commitment to Excellence" program. He will report to Norman R. Augustine, president, as the director of productivity and excellence program.



Augustine

The program emphasizes Denver Aerospace's goal of achieving even higher levels of performance for the company's products and services.

Augustine explained Kronauer's appointment is particularly appropriate because General Electric is considered an industry leader in productivity and excellence programs. Those types of programs are essential "to our ability to win new business and generate jobs."

He added "although excellence is a way of life at Martin Marietta, we can never be content. Remaining ahead of ever-keener competition requires steadfast dedication to improving every aspect of our operation. I am firmly committed to make the effort that will assure the continuing preeminence of Denver Aerospace, and will be looking to Cliff Kronauer to bring the benefit of his experience to our program."

U of Wyoming receives \$100,000 from Denver Aerospace

Development of computer-aided design programs at the University of Wyoming College of Engineering have received a \$100,000 boost from Denver Aerospace.

The gift will equip the new Martin Marietta Computer Graphics Teaching Laboratory for student training in a rapidly-expanding technology of some 1700 graduate and undergraduates enrolled in engineering disciplines at the Laramie campus. It is expected to be equipped and functioning by fall.

"This funding will have a major and beneficial impact on our computer-aided design instruction collegewide," said John Steadman, associate dean. "It will provide equipment for a facility equal to, or better than any to be found in an academic setting anywhere in the country."

Kronauer joins Martin Marietta from General Electric where he has served in various capacities, including department general manager, and president of the Management and Technical Services Company, a GE affiliate. For the past six years, he also has been deeply involved in productivity and quality improvement programs, and headed up division productivity programs at the GE Space Systems Division at Valley Forge, PA.

"My primary mission," said Kronauer, "is to see that we, at Denver Aerospace, continue to pursue our policy of excellence, enhancing it along each step of each phase of everything we do for our customers, and that our work culture here becomes instinctively infused with the tenet of 'doing the job right the first time.'"

Augustine first announced the "Commitment to Excellence" program in the December 21 yearend issue of *Martin Marietta News*.



Kronauer

Inventions net cash awards for 11

Eleven Denver Aerospace inventors have been granted cash awards by the Denver Product Development Review Board for their innovations.

They are:

Fred E. Lukens, electronics: "Active Power Filter Capacitor;" Dr. Wayne E. Simon, engineering mechanics: "Explosive Momentum Transfer for High Strain Rate Materials Testing;" Richard L. Idler, engineering mechanics: "CAM Actuated Self-Locking Hinge;" Dr. Raymond D. Rempt, test, and Dwaine J. McKellips, manufacturing: "Motion Immune Absolute Angle Measurement through Windows into Hostile Environments" and "Motion Immune Remote Displacement Measurement;" Fred A. Morris and Clete J. Siebert, engineering mechanics: "Passive Nitinol Sun Seeker and Tracker;" Stephen M. Pompea and Derek W. Bergener, electronics, and Dr. Donald F. Shepard, engineering mechanics: "A Superior Black Surface for Infrared Use;" and Dr. Gene L. Lang, electronics: "Time-Domain Measurement Technique to Determine Antenna Response Delays."

He then noted that among key ingredients "in our ability to win new business is our continued impeccable performance on existing business, coupled with our operating efficiency. We are in an extremely strong position in meeting cost, performance, and schedule goals on our approximately 450 ongoing contracts. Productivity also is of the utmost importance in winning new business, and the government is placing increased emphasis on contractor efficiency. While overhead always has been a concern, we can be proud that we reduced our expenditures last year by some 22 percent. But, more belt-tightening and attention to cost efficiency is necessary if we are to beat our extremely able competitors in new business endeavours. Our future success depends on our being lean, efficient and quick on our feet."

Martin Marietta earns \$1.00 in 4th quarter; \$4.73 for the year

Martin Marietta reported 1983 net earnings of \$141,331,000 or \$4.23 per share (\$4.05 fully diluted), compared with \$91,642,000 or \$1.95 per share in the year before. Sales rose to a new high of \$3,899,258,000 from \$3,526,506,000 in 1982.

Fourth quarter results showed net income of \$37,437,000 or \$1.00 per share versus a loss of \$2,384,000 or 8 cents per share for the last quarter of 1982. Fourth quarter sales of \$1,159,955,000, up from \$940,281,000 in the same period of 1982, were the highest for any quarter in the Corporation's history.

All per share figures are adjusted to reflect the 3 for 2 stock split that occurred in the fourth quarter. Average number of common shares outstanding for the year was 30,836,147 versus 47,096,835 for the preceding year.

Other income in 1983 included pretax gains of approximately \$117 million from the following sources: \$46 million from the sales of certain operations in cement, industrial sand, and chemicals; \$44 million from the sale of investments in business properties; and \$27 million from the sale of certain nonoperating Florida real estate, all of which contributed \$1.79 per share to 1983 net earnings. Interest expense for the year was \$110,069,000 compared with \$68,334,000 in 1982.

"The year's results reflect continued strong gains in Aerospace and Data Systems augmented by a significant rebound in basic products," said Thomas G. Pownall, chairman and chief executive officer. "Each operating company contributed to earnings in the fourth quarter and, given a continuing recovery of the nation's economy, we expect all operating companies to show further sales and earnings gains in 1984," he said.

Martin Marietta Corporation's financial condition improved significantly during 1983. Long-term debt was reduced from \$1.23 billion to \$614 million and the debt-to-capital ratio from 74 to 42 percent at yearend.

Recreation

Archery—The Red Rock Bowmen will hold a general membership meeting on Tuesday, February 7, at 4:15 p.m. at the recreation area club house. Alpine Archery will give an archery equipment review and update at the recreation area on Tuesday, February 14, at 7 p.m. Beginning Monday, February 20, an indoor bowhunter league will be held on Monday nights. Time and location will be announced.

Fitness Club Memberships—Martin Marietta employees can join Nautilus Fitness Centers for a special rate of \$100 for one year and \$200 for two years with a \$99 renewal. The offer expires on February 10. Call 988-6220 for details.

Discount Lift Tickets—Discount ski lift tickets are available for the Vail and Beaver Creek ski areas. Martin Marietta employees can buy a regular-priced \$22 lift ticket for \$17. Tickets are good every day except February 18, 19, and 20, and must be used at Beaver Creek by April 15 or Vail by April 22. See recreation racks.

Skiing—The Martin Marietta Satellite Ski Club announces a three-day trip to Park City, UT for nonmembers and members, departing at 6 p.m. Thursday, February 23. The \$140 cost does not include lift tickets. Contact Mike Stachnik, ext 8560 or Rob Stanford, ext 1867.

Ladies Golf—Martin Marietta's Ladies Golf League is taking applications for the 1984 season. Play is scheduled for the third week of May through the last week of August. For more information, contact Diane Fults, ext 2546, or Debbie Didomenico, ext 2604.

Ultralight Flying—Allen Sharkey, owner of Colorado Ultralights, Inc., will present a talk and video presentation on ultralight flying at the February 14 meeting of the Titan Flyers. The meeting is set for 5 p.m. at the recreation area club house. Nonmembers are welcome at a \$1 charge.

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Call Ext. 5364 with information or suggestions for articles. or call one of the following coordinators.

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February 3, 1984



Martin Marietta Data Systems notched second place in company-sponsored flag football competition this past season after losing 20-6 to undefeated Conville's Pub during recent championship play at the company's recreation field. Conville's compiled a 9-0 record and Data Systems' was 7-3. It was the third year of flag football at Martin Marietta with nine league teams scoring more than 700 points in the 34-game series. It was also the second season in a row Martin Marietta participated in the Denver tournament and came away with trophies. Displaying their trophies, left to right, are: Hal Wick, assistant flag football commissioner; Dave Silva, Data Systems' team captain; Jerry Turco, Conville's captain; and Jayson Cowley, commissioner.

Recreation office has variety of discount tickets for employees

Discount movie tickets for most area theaters are just a sampling of the many specially-priced entertainment offerings employees can pick up at the Recreation Office or through recreation representatives at various Denver Aerospace locations.

Available are discount Regional Transportation District bus tokens; Magic Kingdom Club cards for Disneyland, Disney World, and the Epcot Center, as well as to similar attractions around the country that allow lower priced admissions.

Recreation representatives for 1984 are:

- Greenwood Commons: Betty Baker, Bldg 8100, second floor, ext 2048, 9-10 a.m., and 2-3 p.m.;
- DSC II: Kay Shuey, module G50, ext 7467, 1-3 p.m.;
- SLF: Lucy Winka, Personnel Office representative, ext 2818;
- LSC: Georgeanne Wood, module 205, ext 0111;
- Inverness: Maree Lazzaro, Bldg 98, room 110, 740-3001;
- West Point: Nadine Holder, module 363, ext 7886;
- Main Plant: Lori Sharp, Eng Bldg, module 124G, ext 6750, 10:30 a.m. to 3 p.m..

Getting belted

A conservative estimate from the National Safety Council contends that at least half of the 50,000 persons killed each year on U.S. highways would have survived had they been wearing seat belts.

The Office of Personnel Safety cited their statistics (less than 20 percent of the nation's drivers use seat belts), and urged all Denver Aerospace personnel to buckle up.

Stop Press

Martin Marietta wins air traffic control contract

Martin Marietta Aerospace has been awarded a \$684-million contract to do the primary systems engineering and integration for a sweeping overhaul of the nation's air traffic control system. The 10-year cost-plus-award-fee contract was awarded on January 31 by the Department of Transportation, Federal Aviation Administration (FAA). Under the contract, Martin Marietta's new Air Traffic Control Division will play a major role in implementing the FAA's comprehensive blueprint for modernizing and restructuring the country's air traffic control, navigation, communications, and auxiliary systems. Work on the contract is expected to begin immediately at the new division's headquarters in Washington, D.C., said Vice President Frederic H. Hudoff, who will head the division. (See next issue of Martin Marietta News for an in-depth report.)

Employee 'gift of life' donations totaled 841 pints of blood during 1983

Denver Aerospace employees donated 841 pints of blood during various 1983 Belle Bonfils blood drives at company locations.

Persons at the main plant donated a total of 614 pints, 134 at Denver Systems Center, and 93 at Littleton Systems Center.