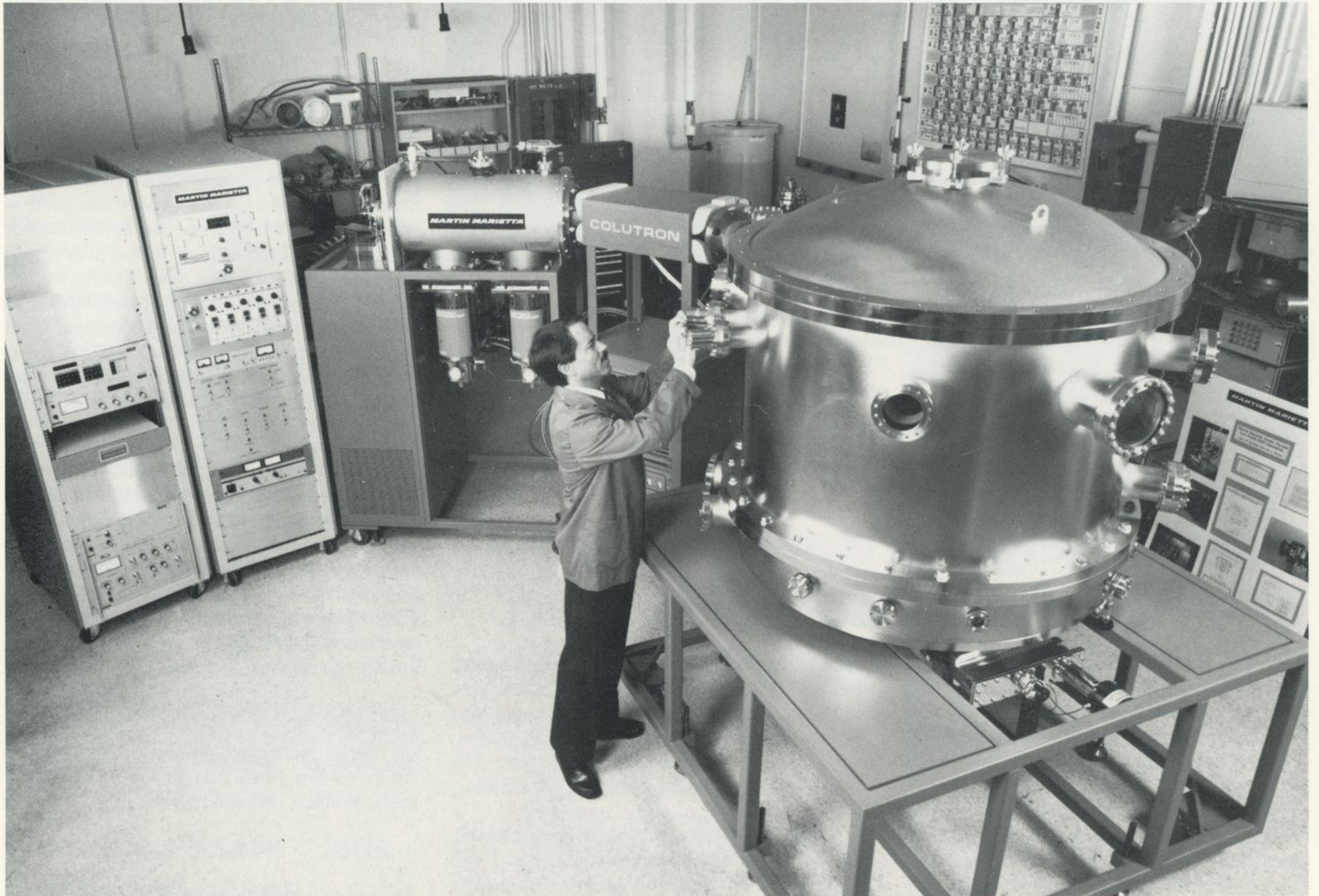


June 5, 1987

Number 11



Lyle Bareiss, atomic oxygen program manager, at a prototype of the Atomic Oxygen Simulator System.

## Simulator built to study atomic oxygen

NASA's space station, to be in orbit by the mid-1990s, must be designed to survive and remain operational in space for at least 30 years. This requirement is presenting unique challenges for engineers working on the project.

One of the toughest problems they face is what to do about atomic oxygen.

Atomic oxygen particles result when low density oxygen in space is broken down by solar radiation. Atomic oxygen is the predominant gas in low orbit—200 to 500 miles from Earth. It is a highly corrosive, oxidizing agent, and has caused damage to satellites in orbit. Although atomic oxygen particles are relatively stationary in space, their corrosive action is greatly intensified by the "orbital wind" created by orbiting space vehicles moving at 18,000 miles-per-hour.

Scientists began to study the problem of atomic oxygen degradation during postflight inspections of space shuttles. For example, they discovered that atomic oxygen had caused the insulating blankets, used to protect television cameras in the shuttle payload bay, to lose 30 percent of their thickness during missions lasting only five days. After 15 days, these insulating blankets might have disintegrated.

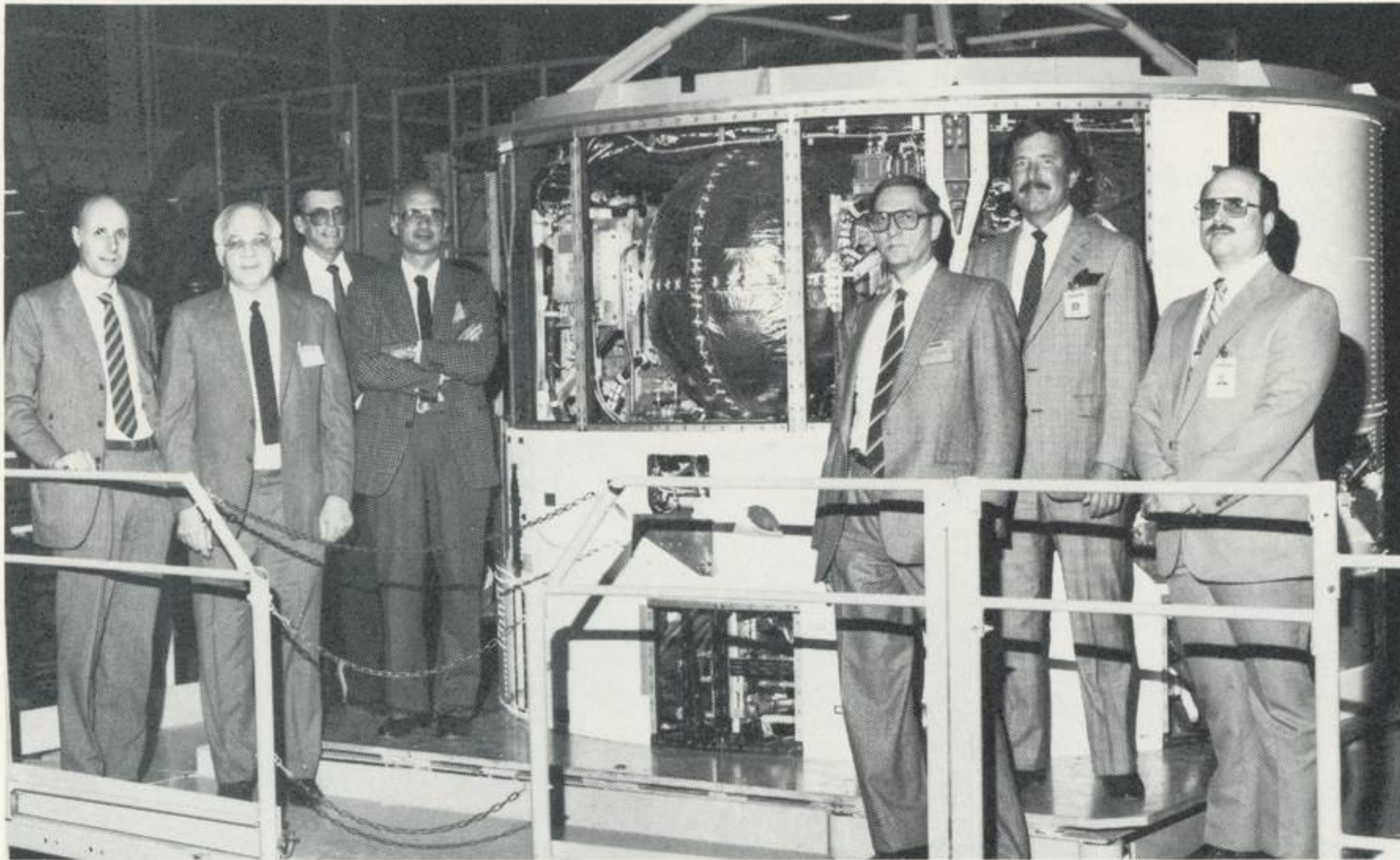
The space station, expected to be in orbit for decades, will require special coatings, materials, and even special lubricants to safeguard against deterioration caused by atomic oxygen.

To analyze atomic oxygen deterioration, and to identify the most resistant materials available, engineers at Denver Aerospace, in conjunction with Colutron Research Corp. of Boulder, Colorado, have developed an Atomic Oxygen Simulation System for NASA. The

simulator, built under a \$450,000 contract, is being prepared now for delivery to NASA's Marshall Space Flight Center in Huntsville in July. Martin Marietta also has invested \$1 million in atomic oxygen research, including the development of a prototype atomic oxygen simulator at Waterton.

"NASA's simulator will be a national facility for evaluating the long-term effects of atomic oxygen on space vehicles," said Lyle Bareiss, atomic oxygen program manager. "It will be used to select materials in the design of the space station to ensure a long lifetime at minimum expense. If a material deteriorates, you have to go up and repair it or replace it, and that's expensive."

*Continued on page five*



### Italian representatives tour Denver Aerospace

A group of Italians visited Denver Aerospace recently to consider the Commercial Titan as a launch vehicle for Italian Satellite (ItalSat). Standing next to the Titan III Transtage in the factory are, left to right, Dr. Franco Marconicchio, PSN/CNR Company; Melvyn Savage, COMSAT Information Systems Division; Walt Caughran, general foreman of Titan electrical and structural assembly; Guido Morelli, ItalSat program manager; Francesco Valdoni, professor of communication electronics, University of Rome; Thomas Mayfield, manager, International Program Development; and Chuck Spearman, Business Development, Commercial Titan.

## Denver Aerospace awarded x-ray laser technology design contract

Martin Marietta has been selected to develop acquisition, tracking, and pointing (ATP) designs for a directed energy x-ray laser weapon concept and perform subsequent technology development and testing of critical subsystems.

This program is a follow-on to a previous contract won in September 1985 and recently completed. The program is part of the multifaceted studies being conducted in the Advanced Strategic Defense Initiative (SDI) product area.

The \$5.7-million ATP design basic contract will be followed by a \$14.4-million option for

ATP hardware and software testing. Awarded by the U.S. Army Strategic Defense Command in Huntsville, Ala., the project will begin May 5 and continue for 18 months. The option, which may be exercised before the basic contract finishes, is for an additional 18 months.

Approximately 20 people will be involved in the basic contract and approximately 40 will be involved in the option period. The project will be headed by Dr. David A. Nichols, who reports to Robert B. Bolles, head of advanced SDI programs at Denver Aerospace as part of Military Space Systems. ■

## Michoud Aerospace earns NASA's award for quality, productivity

Michoud Aerospace in New Orleans has been awarded the National Aeronautics and Space Administration's 1986 Excellence Award for Quality and Productivity on the External Tank program.

In announcing the award, Dr. James C. Fletcher, NASA administrator, said Martin Marietta saved \$267 million over a period of five years "through a vigorous cost-reduction program and judicious redesign efforts while delivering the tanks an average of nine days ahead of schedule."

The award, announced at the annual meeting of the American Institute of Aeronautics and

Astronautics in Washington, D.C., was established in 1985 to stimulate public awareness of the importance of quality and productivity to NASA and to the United States in international economic competition.

Richard M. Davis, president of Michoud Aerospace, said, "Martin Marietta shares NASA's commitment to quality and productivity, two elements that are critically important if we are to maintain America's long-held position as one of the greatest manufacturing nations in the world. We are extremely proud to receive the NASA Excellence Award." ■

## Interceptor system to come on line

The Lower Brush Creek interceptor system, a key part of Denver Aerospace's groundwater cleanup program, will begin full operation this month.

According to Bill Bath, senior hydrogeologist in the environmental management department, the Lower Brush Creek system completes the installation of groundwater interceptors designed to prevent contamination from leaving Denver Aerospace property.

The groundwater in the Brush Creek area is one of two major paths by which contaminated water can leave the site. The other path is Filter Gulch, which also has an interceptor system and a stripper treatment plant designed to reduce volatile organic contaminants to non-detectable levels in collectable groundwater. The Filter Gulch interceptor and the stripper plant were completed in late 1985. "The Filter Gulch interceptor system is effectively curbing the offsite migration of contamination," Bath said.

The Lower Brush Creek interceptor system consists of a large, gravel-filled trench located a few hundred yards north of the main gate at the Waterton facility. Three large wells in the trench allow groundwater to be removed and delivered to the same stripper plant as the Filter Gulch water where volatile organic contaminants, including trichloroethylene (TCE), can be removed.

Bath says his department will concentrate on eliminating the sources of these contaminants on Denver Aerospace property, including five inactive waste ponds that previously contained metal sludges, oil, and solvents. ■

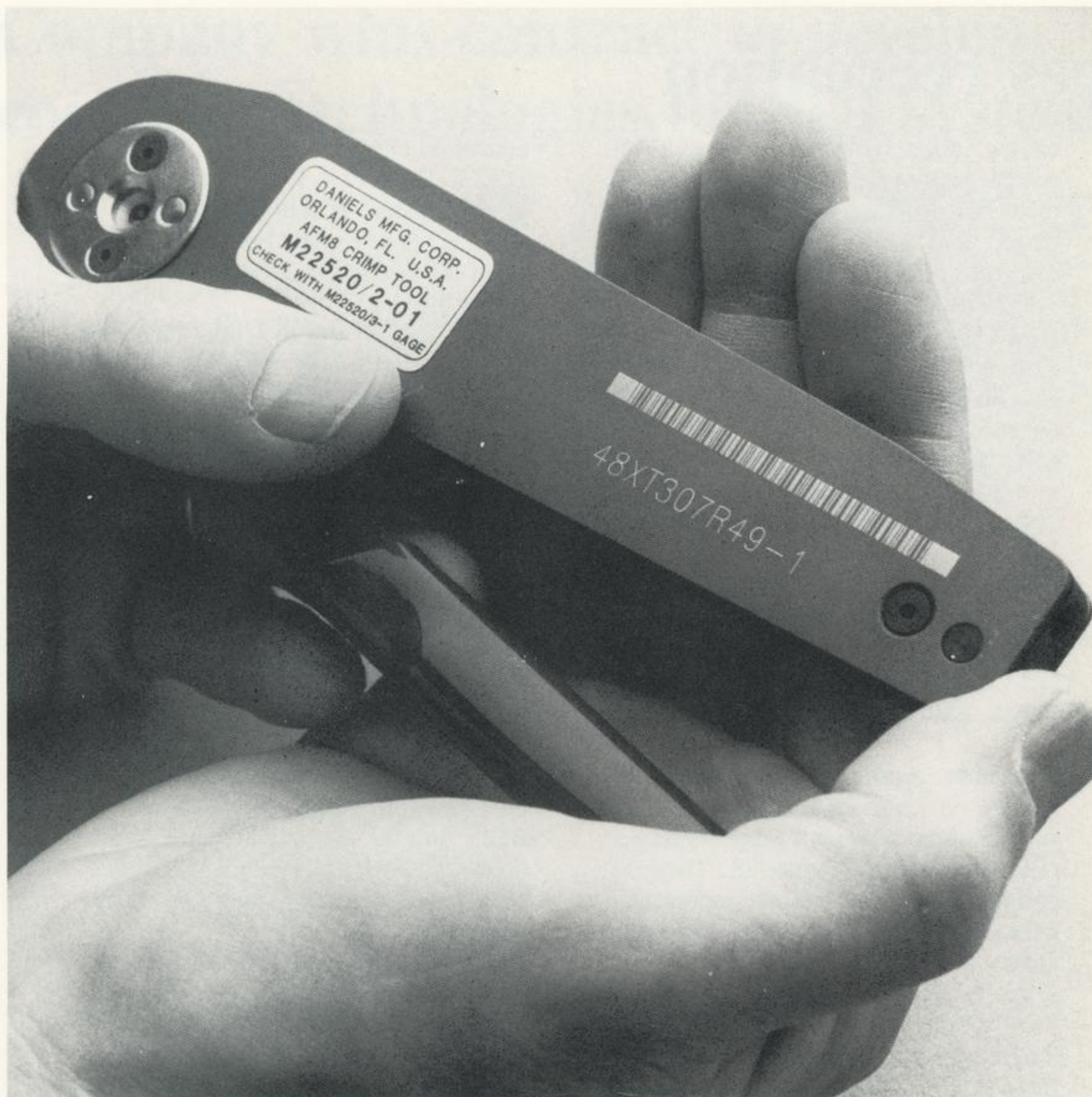
## Cadet Baldauff earns Martin Marietta award

Cadet Firstclass Regis J. Baldauff, son of Mr. and Mrs. R.A. Baldauff of Fridley, Minn., has been named the Outstanding Cadet in Space Operations for the class of 1987 at the U.S. Air Force Academy in Colorado.

The award is sponsored by Denver Aerospace in memory of Lt. Col. Robert C. Rounding.

Col. Rounding was a tenure associate professor of mathematics at the academy during the 1950s and 60s. He was killed in an air crash in Palmdale, Calif., in February 1968 while on a sabbatical from the academy for service in Vietnam.

Cadet Baldauff, along with his classmates, increases the number of Academy graduates who have served throughout the Air Force to more than 20,390. Since 1959, Academy graduates have served as pilots, navigators, engineers, maintenance officers, and professionals in a number of other technical fields.



Bar code is etched on crimp tool.

## **PROJECT CHALLENGE**

One time-saving technology that Denver Aerospace is using to reduce costs involves the installation of bar codes similar to the Universal Pricing Code used in supermarket check-out stands.

"Our use of bar codes in the Electronic Manufacturing Facility (EMF) and in our tool control operations is proving the value of abandoning our manual input systems," said Rick Burris, manager of finance/automated systems for Production Operations.

Burris said bar code symbols lend themselves to record-keeping applications because they convert clearly and quickly to mechanized systems. "Not only can the bar code symbol be read in any direction, but it is easily legible, no matter what size it is printed.

"We have been using bar codes in EMF to identify work orders, thereby reducing the time needed to enter this information into the computer by shop employees," Burris added. The chance of an error is virtually nonexistent after the correct number has been placed on the work order.

"This has been making our time accounting faster, easier, and even more accurate," Burris said.

The tool management operations have added

a laser etching machine to their equipment so that tools may be identified individually, no matter what shape or size. After the bar code identification is on the tool, issuing and documenting the return of tools becomes a fast and highly accurate operation, Burris said. Lines at the tool cribs and paperwork in the tool cribs have been reduced dramatically, he said.

Future applications of bar code technologies will include nonconformance Martin Marietta Automatic Reporting System (MARS) forms, shop travelers and work orders, and indentifying and managing property and equipment.

"We want to ensure that each of our installations of automated systems includes an evaluation of the merits of bar coding. Omitting data entry tasks and errors caused by trying to enter numbers too fast are virtually eliminated as bar coding is installed," Burris said.

"We are committed to improving our technologies, including a continued and careful use of bar codes wherever the return on the investment is most advantageous."

These types of advances and productivity gains are supported and will be incorporated into the thrust of Project Challenge short-term pilots and long-term strategic plans. ■

## **Counsel's corner**

On the first day of work at Denver Aerospace, most of you signed an Employee Patent and Confidential Information Agreement. This agreement clarifies the relationship between Martin Marietta Corporation and its employees in two important areas: ownership of inventions, and protection of confidential or proprietary information.

The agreement says that Martin Marietta will own any invention, along with associated patents, that you conceive or make during employment with the corporation when the invention is related to the business or products of the corporation or of any company it owns. Thus, if you were to invent a space station component, a process for fabricating printed circuit boards, or a valve that could be used on a fuel tank, ownership of the invention would belong to Martin Marietta.

On the other hand, if you invented a new design for a piece of lawn furniture or a new style of fishing reel in your home workshop, you would own the invention and any patents on it.

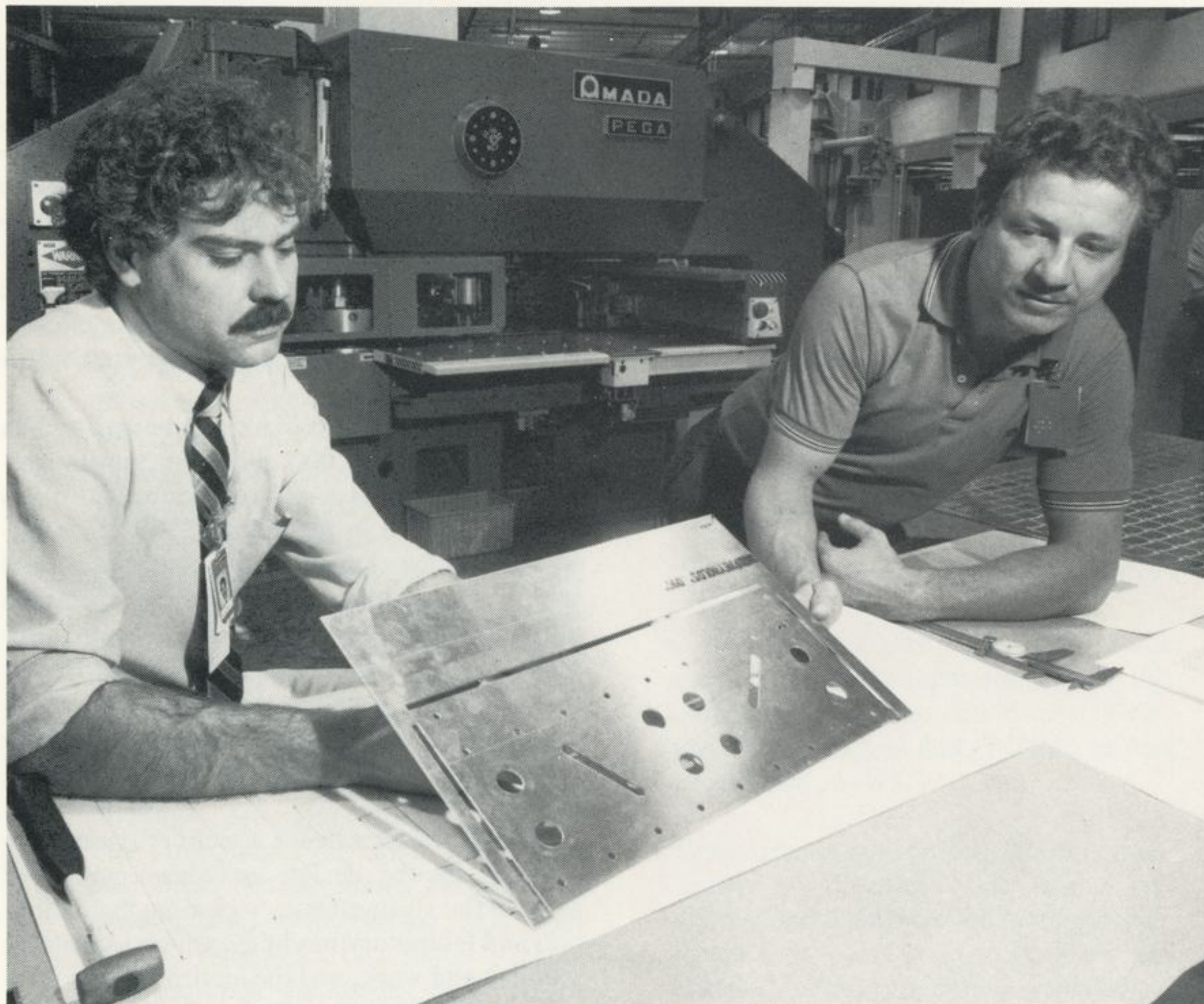
Written agreement on invention ownership rights not only helps avoid misunderstandings, but also enables the corporation to comply with U.S. government contract regulations that often require the contractor to obtain rights to government-funded inventions and pass them on to the government.

The agreement also assures that Martin Marietta confidential or proprietary information, which gives the corporation a competitive edge over other companies, will be protected. This is especially important in competitive procurements.

Many of you handle or are exposed to Martin Marietta confidential information daily. Examples are manufacturing procedures, production techniques, computer programs, system or component drawings, processes, business plans, financial data, bid and proposal information, customer lists, and supply sources. Disclosure of such confidential information to anyone outside of the corporation without proper authorization is strictly prohibited. This obligation continues even after retirement or other termination of employment with Martin Marietta. Most other high-technology companies have similar agreements, and Martin Marietta expects each of you to honor any such agreements with previous employers.

Contact the Legal department, Ext. 7-6109 or 7-6474, if you have questions regarding invention rights or the handling of confidential or proprietary information.

—Patrick M. Hogan  
Assistant General Counsel-Patents



### New equipment first in company-wide modernization plan

A punch press now in use in the factory marks the first major new piece of equipment in the company's broad move toward modernization. The punch press can cut a flat sheet of aluminum or steel to any configuration, as shown here by Paul Konrath, left, project engineer on the machine, and Charles Ponce, sheet metal machine operator. Charles (Buck) Reynolds, manager of detail fabrication, credits the computer-numerically-controlled punch press with reducing time spent setting up and cutting steel and aluminum. The punch press reduced the time spent cutting aluminum stamps from a flat sheet for weld certification from more than ten hours with the conventional method to 30 minutes.

## Corporate news

### RCA American Communication joins FTS 2000 Team

Martin Marietta Corporation has signed an exclusive agreement with RCA American Communications, Inc. (Americom), of Princeton, N.J., for Americom to provide wideband video transmission services as a member of the Martin Marietta team bidding on the federal government's FTS 2000 telecommunications system.

RCA Americom, a subsidiary of GE, will provide broadcast quality television service interconnecting up to 200 government locations in the United States, Puerto Rico, the U.S. Virgin Islands, and Guam via communications satellite.

### Corporation joins Exxon as major funder of performing art series

Martin Marietta Corporation, a pioneer supporter of public television programming, has made a major funding commitment to *Great Performances*, public television's longest-running performing arts series.

The funding commitment, which takes effect immediately, begins with an initial grant of \$1.2 million and will extend through the 1987-88 season of the series.

During the 1987-88 season, Martin Marietta will be an equal funding partner with Exxon, which has been the corporate underwriter for *Great Performances* since its premiere in 1973.

Beginning its 15th season next September, *Great Performances* will feature programs in music, drama, and dance, as well as profiles of American performers and composers.

"We are delighted to be able to provide support to television's premier showcase," said William B. Harwood, corporate vice president of public relations. "We commend Exxon on its long-term relationship with *Great Performances* and hope that our commitment will help guarantee the continuity of this venerable and critically acclaimed series on public television."

## Service group seeks volunteers

Would you like to be an advisor—on a temporary basis—to a disadvantaged young man who is trying to get started in life?

Joint Action In Community Service, Inc. (JACS), is looking for volunteers to advise youths, ages 16 to 22, who have attended federal Job Corps programs, and are trying to find work in Denver or Colorado Springs.

JACS is a national, nonprofit volunteer agency founded in 1967 by a coalition of Protestant, Catholic and Jewish organizations. The JACS office in Denver needs more volunteers to help the 45 young men who return or relocate to Denver and Colorado Springs each month after learning such skills as carpentry, bricklaying, or cooking at Job Corps Centers. Most are high school dropouts, often from broken homes and low-income families.

As a JACS volunteer, you would make a commitment for a total of about four to six hours over a period of a month. Volunteers, who must be 24 or older, can be either male or female. They advise the youths on such things as looking for a job, finding a place to live, opening a bank account, or just offering a "friendly ear."

"Volunteers get the satisfaction of knowing they have helped a youth get his life straightened out," says John F. Roehm, Jr., the JACS regional administrator in Denver. If you are interested, call Roehm, 844-2189.

There is a similar volunteer organization for helping young women who have attended Job Corps programs. It's called Women in Community Service (WICS). The coordinator of volunteers in Denver is Cecelia Garcia, 844-5839. ■

#### MARTIN MARIETTA NEWS

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Editor Jan P. Timmons

MARTIN MARIETTA

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DENVER AEROSPACE

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June 5, 1987

# Company wins contract to develop concepts, technologies for SDI system

Martin Marietta was one of two companies selected this week for competing contracts for a space-based kinetic kill vehicle (KKV) System Concept and Integrated Technology (SCIT) program. Rockwell International, the other company selected for a SCIT contract, also received a contract for the three-year KKV flight experiment program.

The cost-plus-award fee contracts were announced June 3 by the Strategic Defense Initiative (SDI) Organization and the U.S. Air Force Systems Command.

Rockwell was awarded \$209 million for the flight experiment program and an additional \$24 million for a 13-month (with options for \$125 million and 31 months) SCIT program. Denver Aerospace, with Orlando Aerospace as a major teammate, will receive \$23 million for a 13-month SCIT program, with options for \$126 million and 31 months.

The two competing SCIT contracts will include work on system concept definition efforts and development/validation (through ground testing) of all critical subsystems associated with KKV system concepts.

The KKV has the potential to serve as the first line of defense in a multitier SDI defense against ballistic missiles by intercepting boosters and postboost vehicles before they complete release of reentry vehicles. It also has the potential to intercept postboost vehicles and reentry vehicles during later portions of ballistic flight as well as defending itself against hostile antisatellite threats.

"When you consider the total long-range value of this contract, it is a very significant win," said Morris H. Thorson, vice president,

Military Space Systems. "We will be developing some technologies that will substantially improve our technical position on all SDI programs. We still feel we are a very strong contender in the KKV program, and intend to perform in an outstanding manner on the contract. The technologies we develop will be useful in other endeavors as well." ■

Continued from page one

The atomic oxygen simulator is a high-energy particle accelerator. In the simulator, molecules of oxygen are bombarded and broken down with electrons, producing atomic oxygen atoms. Then the atomic oxygen is momentarily accelerated by a 3,000-volt electrical field. This acceleration focuses the atomic oxygen into the form of a half-inch-diameter beam. After the acceleration, unwanted atoms are filtered out.

Particles in the atomic oxygen beam are then slowed to about 18,000 miles per hour to simulate orbital wind conditions about 250 miles from Earth and in the orbit of the space station. Next, the atomic oxygen beam is directed into a test chamber where various materials are placed to be tested against the beam's impact. In the test chamber, sophisticated instruments measure damage to the materials, allowing engineers to select the best possible materials for construction of the space station in the 1990s.

Martin Marietta heads a team of companies working on the design and development of parts of the space station, including the habitation and laboratory modules, where astronauts will live and work, and the environmental control and life support systems. Companies bidding for contracts to build various parts of the space station will submit their proposals to NASA by the end of July. NASA is expected to select companies to build the space station by the end of 1987. ■

—Bob Wurmstedt



## Operation Santa Claus solicits volunteers

The Operation Santa Claus organization has planned a work day to help the Gemini Shelter. Gemini is a residential shelter for adolescents who are runaways, beyond parental control, abused and/or neglected.

"Gemini is located in an older building that needs paint and general fixup," said Dan Porter, Operation Santa Claus representative. "We need people who can spend some time helping this worthwhile organization." The workday is scheduled Saturday, June 20. People may volunteer by calling Porter, Ext. 1-6428, or Betty Purkey-Huck, Ext. 7-5265.

Funds for this and similar projects are provided by the group's paper recycling efforts. "We recently started collecting newsprint," said George McCone, president of Operation Santa Claus. "We have large, red containers in the parking lots for employees to discard their old newspapers. We encourage employees to help by recycling newsprint." The project is in addition to the established program to recycle tab runs, copier paper, etc., which has been in effect for several years. ■

## SIP values

Unit values for the savings and investment plan (SIP) for United Aerospace Workers (UAW)—and United Plant Guard Workers of America (UPGWA)—represented employees in April (March values in parentheses) are:

Fund A	(Indexed equity)
1.0596531995	(1.0687044200)
Fund B	(Fixed income)
1.0272965256	(1.0205889517)
Fund C	(Company stock)
.9543136402	(1.0779617395)

## PSP values

Unit values for the performance sharing plan (PSP) for salaried employees in April (March values in parentheses) are:

Fund A	(Indexed equity)
4.6157269768	(4.6601749377)
Fund B	(Fixed income)
2.6587308801	(2.6365533698)
Fund C	(Company stock)
4.6253289689	(5.1771177106)

## Seventh Annual Denver Corporate Games slated for June 5 and 6

The seventh annual Denver Corporate Games will be conducted Friday (today) and Saturday, June 5 and 6, at several locations in Lakewood. Martin Marietta is defending the championship in the A division, which includes more than 2,500 employees.

The games were initiated in 1981 as a fund raiser for the Colorado Special Olympics. Nearly \$80,000 has been raised in the past six years to benefit CSO athletic programs. This year's goal is \$20,000.

More than 90 Martin Marietta employees will participate as athletes or volunteers in a 5K road race, track, volleyball, tennis, racquetball, swimming, bowling, golf, and bicycle races. Opening ceremonies, including the "Parade of Athletes," will begin at 6 p.m. Friday, June 5, before the track events at Jeffco Stadium, West 6th Avenue and Kipling. Admission is free.

## Employee services/recreation

**Mile High L5 Space Society**—The group will meet at 7 p.m. Friday, June 12, at the Presentation Room 103A at SouthPark West. The film, "Space: The Last or Lost Frontier?", a presentation of the National Commission on Space, will be shown. Non-Martin Marietta guests are welcome. Register guests with Natalie at Visitor Control, Ext. 7-5116, before noon on the day of the meeting. Contact Jeff Zerr, 790-3857 (work) or 322-8159 (home).

**Racquetball Tournament**—The results of the 1987 Corporate Games Racquetball Tournament, conducted May 14, 15 and 17 at the Highline Athletic Club, were: Men's A: 1st, Mark Helton; 2nd, John Paolvcci; 3rd, Frank Silva. Men's B: 1st, Eric Pierson; 2nd, Jim McHugh; 3rd, Jim Burke. Men's C: 1st, Greg Goodwin; 2nd, Lou Ripp; 3rd, Scott Nixon. Men's D: 1st, Ben Britain; 2nd, Bob Patton; 3rd, Tom Marsh. Women's: 1st, Kathy Rieger; 2nd, Emma Jackson; 3rd, Anne Mitchell. Fred Neumann, Chuck Roberts, and Mark Helton coordinated the event. Helton and Emma Jackson will represent Martin Marietta in the Denver Corporate Games.

**Archery Club**—The Red Rock Bowmen Archery Club will meet at 4:45 p.m. Tuesday, June 9 in the recreation area clubhouse. Guest speaker John Sarkisian, 1987 World Champion Elk Caller and 1986 Colorado State Champion, will discuss techniques on elk

calling. Also included will be a 45-minute custom field video with learning materials available. Reservations are required and a \$2 contribution is requested. Call Rich McNutt, Ext. 7-3324 or 7-3425.

**Hunting**—The Skyline Hunting and Fishing Club will meet at 5 p.m. Monday, June 8, at the club meeting room in the recreation area.

**LSC Toastmasters**—The group meets at 4:30 p.m. on Wednesdays in Room 103 at LSC. Contact Henry Evans, Ext. 7-0575.

**Commodore Users**—The group will meet at 5 p.m. Tuesday, June 16, in the clubhouse at the recreation area. Contact Chuck Barton, Ext. 7-7430, or Joe Presta, Ext. 1-6957.

**Lakeside Amusement Park**—Discounts on unlimited ride tickets are valid Monday through Friday nights between June 4 and August 28. They are available from recreation representatives or can be found in the recreation racks. The reduced rate is \$5 (regular price is \$6.50). Coupons offering a \$1.50 discount at the Sunday Stock Car Races are also available.

**Hyland Hills Water World**—Discount coupons offering \$1.50 off regular admission to the water park are available at the recreation office and from the recreation representatives.

**Hunter Education**—The Skyline Hunting and Fishing Club will have hunter

education classes June 16-20, and 22 at DSC I. The cost is \$7. There is no need to preregister. A minimum of 10 students is needed at the first class to continue the classes, and you must attend all six classes.

**Platte Canyon Photo Club**—The club will meet at 7 p.m. Wednesday, June 10, in Room 200C at DSC. Guest speakers will be Charles and Rita Summers, professional photographers and naturalists. A slide show and lecture on a four-month trip to Australia and Africa will be presented. The club asks a \$1 fee from members and \$2 for guests, and \$1 may be applied toward membership. Contact Bill Privatsky, Ext. 7-4967.

**May Donors Have More Heart**—Three hundred thirteen employees donated blood during the spring drive at the Waterton facility, May 27-28. The Belle Bonfils Memorial Blood Center thanks all donors for helping to replenish the blood supply after the holiday weekend.

**Discount Coupons for Funplex**—Coupons offering roller skating, miniature golf, or bowling for \$1, plus the cost of any rentals, are available from all recreation representatives and at the employee services/recreation office. The coupons are valid through September 1, 1987, and day and time restrictions are noted on them. The \$1 fee is paid when presenting the coupon at Funplex.



*Peacekeeper team gathers to celebrate equipment delivery.*

## Company delivers final Peacekeeper support equipment

Denver Aerospace has delivered final support equipment for the Peacekeeper system to Vandenberg Air Force Base, Calif.

"The shipment of this, the last operational test and evaluation support equipment, completes a very significant part of our contract," said Gene Bond, instrumentation and flight safety system (IFSS) project director, Peacekeeper.

"About four years ago, we promised to de-

sign, develop, build, and deliver five sets of new support equipment. Incorporating lessons learned from our development, test and evaluation (DT&E) experience, we set a course to make it happen," Bond said.

"John Parker has been our team captain throughout the entire time, and with the outstanding support and dedicated effort of him and his team, the hardware has been fully tested and shipped to VAFB ahead of schedule.

I thank all of you for a super job well done," Bond said.

Denver Aerospace has a principal role in developing the system for the Air Force Ballistic Missile Office, the executive management agency for Peacekeeper. Strategic Systems is responsible for multiple development tasks under assembly, test, and system support; launch system development; and basing studies contracts. ■