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**Satellite
Servicing
Concept**

Satellite servicing definition study begins; extended mission life is seen

Servicing satellites from manned space stations will be the object of a study being launched by the space and electronics division.

The study was awarded by NASA's Marshall Space Flight Center.

The study will define a set of missions to demonstrate the plausibility of satellite servicing. NASA has assumed that a space station will be in orbit by 1990.

A study team will review requirements for servicing satellites in orbit and develop a space station concept to meet those needs. Servicing operations include spacecraft assembly, parts replacement, and refueling.

"On-orbit servicing could extend the useful life of information gathering and communications satellites," according to Robert J. Polutchko, vice president and general manager of the space and electronics systems division.

Shuttle operations featured in exhibit

Denver Aerospace featured an exhibit organized around the theme "Space Shuttle Operations on Earth and in Space," at the American Institute of Aeronautics and Astronautics conference this week in Washington, D.C.

The conference addressed the present capability of the Space Shuttle, and its probable evolution.

The company's exhibit included multimedia presentations on the Department of Defense Shuttle program and the solar maximum satellite repair mission with the manned maneuvering unit, planned for STS-13.

The exhibit also included panels devoted to the Venus Mapper, teleoperator maneuvering system, tethered satellite, aft cargo carrier and Shuttle-derived vehicles, large space structures, and space station concepts.

The DoD and MMU Solar Max shows are available from the public relations department for showing to employee and community groups. A film on MX prepared for last month's Air Force Association exhibit is also available. All three presentations are approximately five minutes long.

New equipment improves analysis, process control

A new instrument that can determine the elemental composition of materials as small as a few parts per million in a spot about one 250,000th of an inch in size has been added to the failure analysis laboratory.

The scanning auger microprobe with a secondary ion mass spectrometer subsystem will be used to determine failure causes and monitor process control in bonding, sol-

dering, welding, plating, and surface treatments in general.

By analyzing the surface of semiconductor devices, hybrid circuits, relays, and motor contacts, the instrument measures contamination or determines thin-film-related problems. It also checks such components during the manufacturing process for accuracy.

Candidates visit; meet employees

Candidates seeking to represent employees in the federal government are visiting Denver Aerospace facilities.

The company's practice of allowing candidates to meet employees in lunch rooms gives the candidate and the employee an opportunity to discuss issues important to each. The objective is to make the employee a more knowledgeable voter in this year's general election.

Candidates from the congressional districts where most employees live are accommodated in the program.

MX safety director receives award

The professional development award, most prestigious recognition of the System Safety Society, has been given to George B. Mumma, director of MX system safety. The award has been granted only four times since its inception in 1976.

Recipients of the award are honored for significant contributions to the system safety profession. Mumma's co-authorship of the MX system safety contractual compliance document, his direction of the Society's fifth international conference, and his 18-year dedication to system safety are the basis for his recognition.

Mumma joined Martin Marietta in 1958. He worked on system safety for the Titan launch vehicle system from 1963 through 1970. He served as manager of crew safety for Skylab from 1974 through 1976 before becoming director of MX system safety.

Vandenberg MX activity at peak

MX activity at Vandenberg Air Force Base is reaching its peak as preparations continue for an early 1983 test launch.

"I believe it is going amazingly well," said John R. Adamoli, who heads the MX test operations at Vandenberg. "I am confident the team is prepared for the hard stretch run as we round the final corner in our preparations."

The team is working three projects in parallel—the installation and checkout of the facilities, the Pathfinder missile, and the flight test missile—in preparation for the first launch.

The INCO Pathfinder missile and the FTM-1 are being processed at the same time in preparation for the first launch.

Contract awarded for advanced inverters

Denver has received a \$345,000 development contract to design and fabricate control and protection circuits for high power static resonant inverters (SRIs).

These inverters have a potential for performing high power conversion at extremely low weight. Thus, they are attractive for both spacecraft and airplanes.

Part of the contract work will be the fabrication of universal controller circuits compatible with existing five, 10, and 200-kilowatt converters.

Richard L. Donovan is the program manager.

Insurance office changes quarters

The Denver offices of the Connecticut General Life Insurance Company will move November 5.

The new address is 950 South Cherry Street, Suite 1500, Denver, Colorado 80222. The phone number, 691-0851, is unchanged.

Business will not be transacted November 5 through November 8 because of the move.

On the cover

Space stations such as the conception on the cover may be in place by the 1990s for a wide range of uses. NASA would like to service and maintain orbiting spacecraft from such stations and has awarded Denver Aerospace a study contract. The artist's rendering was a part of the recent AIAA exhibit.

Next up

Space Shuttle flight 5 November 11

Space Shuttle flight 5 will depart for low-Earth orbit early in the morning of November 11 from launch pad 39A at Kennedy Space Center.

Aboard will be four crew members, two satellites, and a host of scientific and developmental payloads.

Mission commander is Vance Brand, pilot is Robert Overmyer, and the mission specialists are Joseph Allen and William Lenoir.

The flight has a planned duration of four days, with the capability of a one day extension for extravehicular activity by the two mission specialists and two days of contingency operations.

As with previous flights, the external tank produced at the Michoud division will play a key role in the launch. The SRB recovery system developed here will also be used.

Primary objective will be the first launch of satellites from Space Shuttle. Both are communication satellites, weighing about 10,000 pounds, to be boosted into geosynchronous Earth orbit.

SBS-C, which will be deployed on flight day one, is a Satellite Business Systems payload designed to provide all-digital communications for large industries, government, and other users.

Telesat-E, also called ANIK-C, will be deployed on flight day two. It was built by Telesat Canada Ltd. and will provide voice and television communications to a trans-Canada network of Earth stations.

Blood donors to give at new location

The Belle Bonfils mobile blood unit will take donations November 9 through 11 at Eng. 200C during remodeling of the engineering presentations room.

Use of the smaller facility will limit collection stations to six. While drop-in donors may be accommodated, donors with appointments will avoid waiting during the 9 a.m. to 2:45 p.m. donor hours.

Please make appointments through department secretaries, or call Lori Sharp, blood bank coordinator, Ext. 6605.

Quality Circle studies computer use costs

A projected 17 percent reduction in computer use costs is expected to result from work by a Quality Circle made up of engineers in the space launch systems division.

The Mission Analysis Quality Circle reports that an educational program aimed at computer users has already reduced costs in the mission analysis group. Members of the Circle believe an on-going program with others in the space launch systems division can bring further reductions.

Key points in the program are to get users to match computer priority with job urgency, to have a knowledge of how computer charges

Matching gifts programs aid education, the arts

Nearly a quarter of a million dollars for support of educational institutions and the arts is the result of Denver Aerospace employee participation in Martin Marietta matching gift programs.

With the Corporation matching educational gifts \$2.00 for each \$1.00 employee gift, colleges and universities received almost \$200,000 from January 1981 through June 1982.

Under the one-for-one matching gifts program for the arts, more than \$27,000 went to qualifying museums, opera companies, drama companies, dance companies, symphony orchestras, and arts and cultural centers.

Both programs are open to all employees with at least one year of continuous service.

Information and participation forms are available from Betty Hilton, training, education, and development, Ext. 5226.

are determined and the associated budget, and keep a personal log of their own computer use.

Assigning a priority to the computer job has a significant impact on costs. The lower the priority, the lower the cost. Members of the Circle assert that turn around time associated with a median priority is generally much lower than the published maximum.

Members of the Circle making the recent management presentation on the findings were Albert C. Brandts, senior engineer, Titan mission performance; Richard L. Hoffman, senior staff engineer, Titan 34D/IUS mission analysis and TIE support; Jeanne V. Little, engineer, Titan mission performance analysis; William A. Nugen Jr., associate engineer, Titan mission performance analysis; and Judith D. Petersen, engineer, rigid body staging and separation analysis.

Why did they join the Quality Circle? Partly out of curiosity—would it work with engineers, and partly out of seeing a need to improve work and budget performance.

Credit Union posts dividends

Red Rocks Federal Credit Union declared its highest dividends of the year for the third quarter ending September 30.

Dividends, determined on a split rate, were 6.5 percent on deposits of \$5 to \$1,000; 7 percent on \$1,005 to \$3,000; 8 percent on \$3,005 to \$5,000; and 9 percent on deposits of more than \$5,005.

The credit union has assets of \$2.3 million, with more than 4400 members. Accounts are insured to \$100,000 by the National Credit Union Administration, a U.S. government agency.



The mission analysis Quality Circle recently completed a presentation on computer use in the space launch systems division. Members of the circle making the presentation were Albert C. Brandts, Richard L. Hoffman, Judith D. Petersen, Jeanne V. Little, and William A. Nugen Jr.



A Super Mustang II built in a one-car garage is being flown by Kent Paser, systems engineering. Paser says it is one of the most aerodynamically efficient aircraft in the nation.

Childhood dream becomes reality for employee; home-built plane earns awards

Squeezing efficiency from his home-built airplane is a continuing passion for Kent Paser, systems engineering lead on the mission integration support contract.

Paser bought the plans for his Mustang II from the designer in 1968. He built the aircraft one piece at a time in his garage, finishing in January 1971.

Paser has competed in many races, and won the best of class award at the 1971 international convention of the Experimental Aircraft Association (EAA).

Convinced he could coax better performance from the aircraft, Paser modified the Mustang extensively, primarily by reducing drag. The aircraft now has a top speed of 250 mph, 70 mph faster than the original design. Cruising at 12,000 feet at 45 percent power, the Mustang gets 41 miles per gallon at 185 miles per hour.

As a result of the modifications, Paser's Mustang again won the best in class award at the 1976 EAA convention, the only aircraft to win the same honor twice.

The aircraft won most outstanding design for experimental aircraft in 1977, and won the Oshkosh 500-mile race for two-place aircraft at the EAA convention each year from 1978 to 1980.

Paser has been featured in articles in *Sport Aviation* magazine, has been on local television, and receives many requests for advice on aircraft modification. He is writing a book on aircraft performance improvement.

Paser credits many of his ideas to lunch-hour research in NACA yearbook reports found in the company's technical library. (NACA was predecessor to NASA.) Paser applies aviation knowledge from as early as 1914 to his needs.

Building his own aircraft has been a life-long dream. Paser remembers lying in the grass next to the runways of his hometown airport as an eight-year-old, watching airplanes take off and land. He decided then to build one of his own.

Paser worked in systems engineering since he joined Martin Marietta in January 1959.



Cynthia K. Pickering, robotics, receives applause from the crowd as she runs to victory at the finish of the Rawhide Marathon held October 3 in Fort Collins.

College registration calendars distributed

Calendars to help employees plan educational programs at local colleges are being distributed by department administrators.

The calendars show college opening and registration dates, and deadlines for submission of applications for Study Under Company Auspices.

Early planning is recommended since applications for company-sponsored college study are due to educational services at least three weeks before classes begin. Applications received after the deadline will not be approved for the current term.

Applications for Study Under Company Auspices need to be submitted each term. For information, call Bette Wooster, educational services, Ext. 5698.

Employee wins Rawhide Marathon

Cynthia K. Pickering won the Rawhide Marathon in Fort Collins in 2:55:29, the third fastest women's marathon time for the state of Colorado.

Her marathon victory October 3 came less than one month after a win in the five-mile Joe Mandel Corporate team race in 31:18 in Denver's City Park.

When Pickering isn't working on robotics simulation in advanced automation technology, she is likely to be training for her next marathon.

Pickering began running competitively shortly after joining the Shepherders running club in February 1981. Fellow employees encouraged her to try a marathon distance (26 miles, 385 yards) so she began increasing her distances.

"Long runs feel more natural to me. I just get going and start feeling really good at 10 miles," she said.

Pickering runs from 65 to 80 miles per week, many of these on the hills of the recreation area at the plant. "I really like to train here because it's so pretty. You can see deer and other wildlife as you run."

In the past four months, Pickering has won six races, five of them marathons, at altitudes from 4000 feet to 9500 feet.

Pickering is now training for her first sea-level marathon December 11 in Huntsville, Alabama.

How are funds allocated to United Way agencies?

Agency allocations are decided by volunteers from all walks of life. Last year more than 170 volunteers spent more than 5900 hours in agency visitations and budget conferences to allocate contributions based on total needs of the community.

What your United Way gift will provide

\$2.00 per pay period

- * 1 additional educational group program in cancer control.
- * 20 meals delivered to needy senior citizens and handicapped persons.

\$2.08 per pay period

- * 1 wheelchair for a cancer patient.

\$3.00 per pay period

- * 15 minutes of cancer research technologist's time.
- * 6 months' prescription for a victim of multiple sclerosis.

\$4.00 per pay period

- * 6 home visits of 2 hours each to assist the family of a disabled person.

\$5.00 per pay period

- * Transportation for one cancer patient to a treatment facility for 4 months.
- * 7 days of emergency assistance, housing, meals, and counseling for battered persons.

\$10.00 per pay period

- * 9 months of testing and therapy (including hearing aid) for a deaf child.

\$12.00 per pay period

- * 4 weeks of day care center services for children of working parents.

\$12.50 per pay period

- * Hospital bed for one cancer patient in the home for 1 month.

\$15.00 per pay period

- * 12 days of residential care for a child experiencing social and emotional problems.

\$20.00 per pay period

- * 13 people with epilepsy receive counseling, evaluation, referral, and vocational and job development.

\$30.00 per pay period

- * 8 families receive a 3-month family counseling program to prevent child abuse or divorce.

\$50.00 per pay period

- * 2 years of patient training and development for a cerebral palsied child.

Citizens aid United Way agency selection

The United Way works to allocate the money raised to provide the greatest benefit to the people. During the year, community volunteers conduct agency visitations and review budget requests and services offered by those agencies seeking support.

The goal of these review committees is to match funds with services most needed by the community. This citizen review insures accountability and helps good programs receive community support.

Citizen review means that community volunteers actually decide how the dollars raised in the annual campaign will be distributed to the selected agencies and services. All allocations are determined by the volunteer Budget Review Committees and Agency Relations

Committee, with approval of the volunteer Board of Trustees.

Each year Mile High United Way recruits more than 200 volunteers with diverse ethnic, geographic, and occupational backgrounds who donate approximately 35 hours each to participate in the distribution of campaign proceeds through the citizen review process.

Through this process, these volunteers conduct in-depth assessments of United Way agencies each year, evaluating their performance against the following criteria: community need effectiveness of services, efficiency, soundness of agency management, soundness of financial management. Dollars are then awarded based on the outcome of this evaluation.

The volunteer Services Department (837-9999) also recruits citizens to work in agencies as volunteers, thereby cutting down on the agency's overhead. This department operates the Voluntary Action Center, which promotes voluntarism, volunteer programs, and volunteers in metropolitan Denver.

Volunteers Services links people with meaningful volunteer opportunities in more than 600 agencies throughout the community, both United Way and non-United Way agencies. It enhances the quality of programs using volunteers, and helps the community know more about the services and how to use them.

Another United Way objective is fiscal responsibility in the United Way as well as its affiliate agencies. This means all monies coming in or going out are monitored extensively.

Volunteer Financial Committees, supported by staff, maintain monthly financial reports which are reviewed and approved by the volunteer Board of Trustees.

Another benefit of this volunteer practice is that it keeps the Mile High United Way overhead very low. United Way has the most efficient charitable fund-raising program in the United States.

Two join United Way as loaned executives

Two Denver Aerospace employees have become extensions of the United Way professional campaign staff for this year's fund drive.

Serving as Loaned Executives are Roseann Summa and Robert G. Garcia.

During the three month assignment, each will have about 100 companies with which to work. The two are responsible for meeting with the chief executive officers and the campaign coordinators to assist in setting up the in-company fund drives.

Garcia, an engineer in the electronic technological laboratory, has been assigned to the energy division, working primarily with oil companies. This is his second year as a Loaned Executive.

Ms. Summa, administrator of college relations, will be working with firms in the food and beverage industry. Before joining Martin Marietta she had been with the Manville Corp. where she was United Way campaign coordinator for four years.



United Way loaned executives Robert G. Garcia and Roseann Summa compare plans for their work with the organization during the 1982 campaign.

Michoud employees earn trip to launch

A systems refinement team at the Michoud division has won a NASA competition among primary Space Shuttle contractors.

The mechanical assembly group was selected as the outstanding quality circle/system refinement team contributing to the Shuttle program. The competition is the first of its kind conducted by NASA.

The team was awarded a trip to Kennedy Space Center to view the November STS-5 launch.

Since forming the team in January 1980, the group has completed six major projects, including design of a new liquid hydrogen tank entry platform and a new liquid hydrogen tank internal tank entry ladder, allowing easier and safer access inside the tank.

Four other Michoud teams were in the competition: executive secretaries; super-light ablator mold room; receiving inspection; and vertical assembly building tooling.

Exhibits planned for open houses

Two Denver divisions and Aerospace company field offices are supporting open houses at major Air Force installations this month.

Space launch systems participated in the Air Force Space Division's open house in Los Angeles October 16 with an exhibition of Space Shuttle and launch vehicle photographs, and a multimedia presentation on the Department of Defense Space Transportation System.

Tomorrow, the strategic systems division is presenting an exhibition of photographs showing the status of the MX flight test program, along with a new movie on overall MX development, at Norton Air Force Base, California, headquarters of the Air Force Ballistic Missile Office.



The winning system refinement team in a recent NASA competition will soon be on its way to Kennedy Space Center for the November Space Shuttle launch. On the team, back row, left to right, Spurgeon G. Frost, Charles P. Englebracht, Daryl Smith, Greg A. Calderone, Kenneth G. Budd, M. Keith Martinez, David E. Mitchell, and Billy K. Gauley. In the front row are Raymond E. Tetens, Stanley Morand, Doris A. Revere, Bethel B. Pierce, Dave B. Rawson, Enos I Cozier (faciliator), William J. Schmitz Jr., and Juan H. Olivaries.

Company vehicles converted to propane

Conversion of 23 company vehicles to propane fuel use is returning significant fuel cost savings.

The vehicles have been equipped with propane fuel tanks and fuel injection systems. Standard gasoline fuel systems are used as backup.

Many company vehicles must refuel two or three times daily. With propane fuel priced 50 percent less than unleaded gasoline, savings are significant.

The propane conversion systems are removed when vehicle leases expire and are installed in newly leased vehicles.

Recreation

Basketball—Men's and women's intramural basketball leagues are forming. Entry forms are available in recreation racks.

Scuba—Nature photographer Boyd Norton speaks on underwater photography at 7:00 p.m., October 25, at DSC I, MIC Room 200K.

Parapsychology—Jane and Jon Schultz will speak on "Symbology and personal growth" at 5:15 p.m. October 28 in room 364, DSC II. Obtain security clearances for guests more than 16 years old by calling Gloria Kratz, Ext. 5609 by October 26.

Photography—Incident and reflected light is Brad Meacham's topic at the October 28, 7:00 p.m. meeting of the Platte Canyon Photography Club, DSC I, Room 200K.

Tennis—Trophies and gift certificates go to winners of the "Weekend Hackers" tennis tournament November 6 and 7 at Arapahoe Community College. Entry forms are due to recreation by October 27.

Office hours—The recreation office window is open from 10:30 a.m. to 3:00 p.m. Monday through Friday.



A \$10,000 Martin Marietta Corporation grant was presented the California Central Cost United Way at its kick-off banquet held at Vandenberg Air Force Base. In recognition of the gift, Space Shuttle astronaut Major Loren Shriver gave an autographed photo of the first Space Shuttle launch to Ernest R. Lloyd and Ruth Ritchie, who represented Martin Marietta from its Vandenberg operations.

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