

May 25, 1990 Number 10



Space Systems wins SUPER

ALVDA rated 'excellent' for last fee period

The Advanced Launch Vehicle Development and Application (ALVDA) program received a performance rating of "excellent" from the Air Force during the last contract award fee evaluation period.

A letter from Lt. Gen. Donald L. Cromer, commander of Space Systems Division, to Andrew J. Stofan, vice president of Technical Operations for the Astronautics Group, cited four factors as contributing to the high mark for the period Aug. 1, 1989 through Feb. 12, 1990.

"... outstanding implementation of Total Quality Management concepts and tools to meet the challenges associated with the ALS program."

—Lt. Gen. Donald L. Cromer

Topping the list was the "outstanding implementation of Total Quality Management concepts and tools to meet the challenges associated with the ALS program."

Other factors included:

- Outstanding presentation of innovative designs and operations concepts at the Delta System Design Review;
- Innovative approach to the development of the system segment and, in particular, the system engineering database; and
- Well-focused and well-managed efforts to take full advantage of the Advanced Development Program technologies.

"We are extremely pleased with our customer's evaluation of our performance. It says a lot about the quality of our team," said Stofan, who headed the ALS team during this evaluation period.

"The ALS team, under the direction of Richard VandeKoppel and Warren Beery, is to be commended. The ALS work on technologies will help us keep improving the Titan IV," said Art Morrissey, program director for the Advanced Launch Development and Applications Group in the Space Launch Systems company.

The ALS program was combined recently with the Titan IV Pre-Planned Product Improvement in the Advanced Launch Development and Applications Group to help provide for a more aggressive infusion of ALS technologies into the Titan IV program.

Meanwhile, the Air Force is restructuring the ALS program as a technology development effort. ■

Black employees benefit from BEST efforts

The Black Effectiveness Support Team, BEST, is a proactive organization of black Astronautics Group employees established last year to enhance the professionalism of black employees, O C Houston, BEST president, said.

Working as a High-Performance Work Team, BEST members focus on specific objectives and actions to meet those objectives. "We want to improve and assist the promotion, retention, and recruitment of black employees at Martin Marietta," Randall Mattison, vice president of BEST, said.

To meet its goals, BEST works closely with Astronautics Group management and other organizations such as the United Negro College Fund, Colorado Black Roundtable, and the Urban League. "These organizations that our employees and management have supported epitomize the responsibility, vision, and commitment necessary for the black community to be effectively utilized as viable members of our company and community," Mattison said.

Internally, BEST, of which any employee can be a member, works hard to educate members on how to be better public speakers and leaders and offers training to cultivate professionalism, he said.

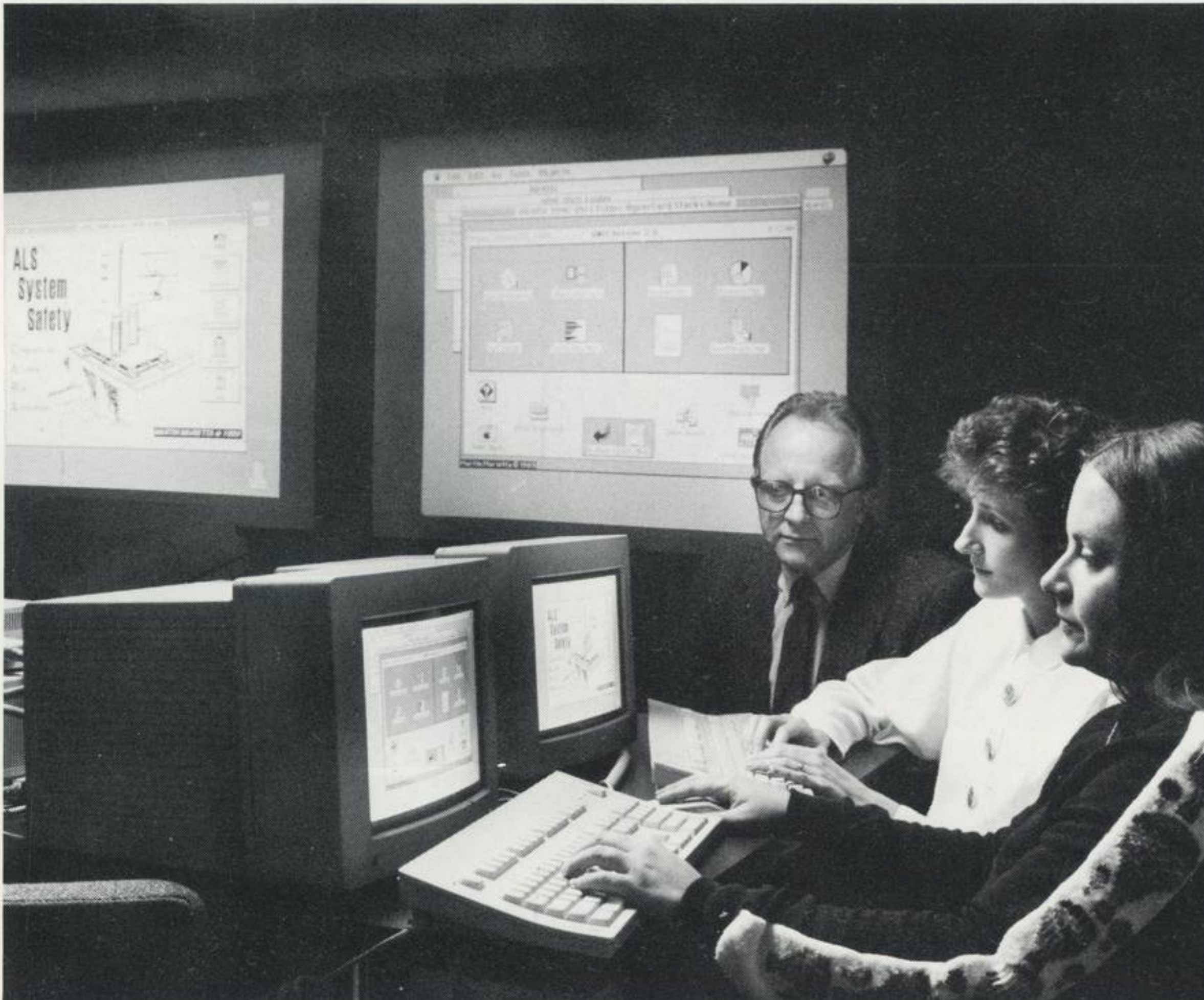
Last Saturday, Stanley F. Albrecht, vice president of Human Resources, spent several hours at the monthly BEST meeting to discuss issues and concerns.

Several other members of the Astronautics Group's management team, including Ralph Barr, director of Equal Employment Opportunity and Affirmative Action; Evan McCollum, manager of Public Relations; and David Hunter of the Small Disadvantaged Business department also have worked to support the vision of BEST.

"We plan to continue building on the relationship that BEST and the Astronautics Group have developed in order to better serve all employees, customers, and potential new employees," Houston said.

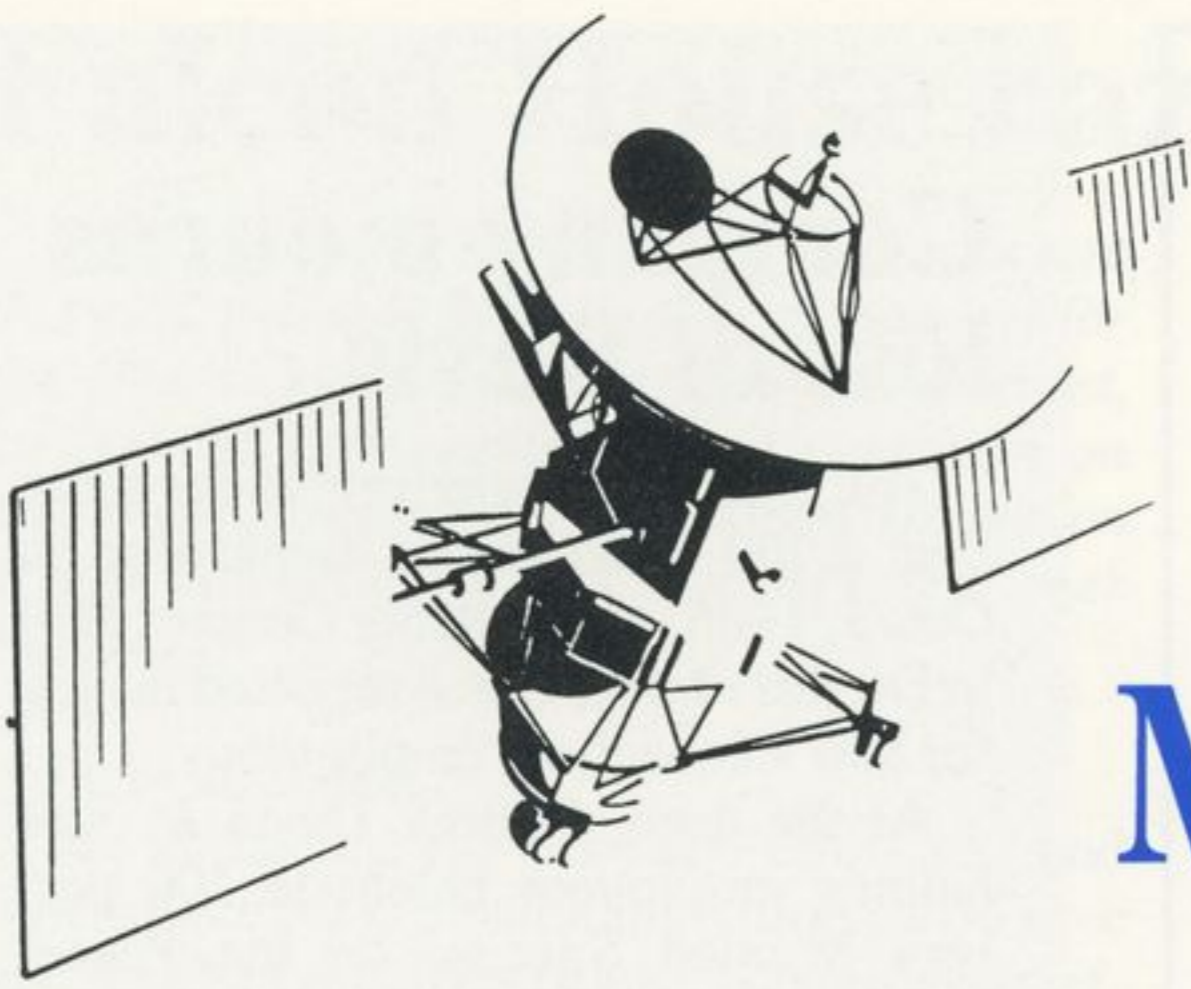
Magellan mission news updated on Pages 3 and 4

Due to the great interest in the Magellan mission to Venus, the complete May 11 *Magellan Mission Bulletin* has been printed on Pages 3 and 4 of this issue of the *Martin Marietta News*. Since the bulletin was issued, Magellan has traveled a little closer to Venus, and as of today is 11.6 million miles from that planet and 105.3 million miles from Earth. The radar mapping tests are progressing successfully, and the spaceflight team continues to busily prepare for Venus Orbit Insertion in 77 days. ■



ALVDA shines

Jerry Anderson, left, Mary Grand, center, and Lynne Willman of the Advanced Launch Vehicle Development and Application program set up Unified Information System (UNIS) screens for a major presentation. The Advanced Launch System (ALS) program received a rating of "excellent" from the Air Force during the last evaluation period. Among the reasons were well-focused and well-managed efforts by the ALS team to take full advantage of advanced technologies, one of which is UNIS. UNIS was developed by the ALS team and ties a number of databases together to help keep people better informed.



Magellan Mission Bulletin

May 11, 1990 Number 3

Minor thruster burn moves Magellan into line for final trajectory correction maneuver

Using about a pint and a half, or 0.75 kilograms, of fuel in half a second, the Magellan spacecraft successfully performed a minor trajectory correction maneuver March 13, the second of three maneuvers to keep it on course during its 795-million-mile journey to Venus.

The brief burn of the spacecraft's rocket engines changed the spacecraft's velocity by less than half a meter per second, correcting its flight path and lining it up for its final trajectory correction maneuver in July.

According to Keith Hamlyn, who leads the Martin Marietta Magellan propulsion group, this small maneuver went so well that the third maneuver—which will be about the same size—will require much less fuel than originally anticipated.

The final maneuver is scheduled for July 25, just 16 days before Magellan is inserted into orbit around Venus. When completed, the amount of propellant consumed during the cruise is expected to total less than 10 kilograms, about half the amount budgeted.

Magellan Watch

Date: May 11, 1990

Distance from Earth:
103 million miles

Distance from Venus:
15.6 million miles

Velocity:
69,327 mph relative to the sun
18,898 mph relative to Venus

"The savings are a direct result of the two very successful midcourse trajectory correction maneuvers we've made as well as the high degree of accuracy achieved in the original Inertial Upper Stage (IUS) boost," said Hamlyn.

Preparations underway for insertion of Magellan into Venus orbit

With Magellan on the final leg of its cruise to Venus, Martin Marietta's spacecraft team in Denver has already begun preparing for its arrival at that planet on August 10.

In early April, the team conducted a technical review of the command sequence that will put the spacecraft in orbit around Venus—a maneuver called Venus Orbit Insertion (VOI). The commands—which are prepared and transmitted to Magellan in advance and stored in onboard memory for later execution—tell the spacecraft what to do during the critical period from 24 hours before Venus orbit insertion through separation of the solid rocket motor from the spacecraft eight hours later.

"The purpose of this technical review," said Ken Ledbetter, Martin

Marietta's spacecraft mission operations manager, "is to carefully examine the timing, order, and sequencing of commands that will be sent to the spacecraft for VOI. In effect, it allows us to understand what we will be doing at critical times and make sure all the commands are timed and sequenced properly for a perfect maneuver."

The review—a "walk through" of the sequence on paper—is only one part of a series of testing to verify that both the spacecraft team and Magellan are ready to perform flawlessly during orbit insertion. Ground tests of the VOI sequence on the spacecraft began long before Magellan was launched and continue to be tested using computers, spacecraft breadboard hardware, and software in the Magellan Systems Verification Laboratory Simulator at Martin Marietta.

"Other testing critical to VOI has been conducted on the spacecraft during cruise," said Ledbetter. "Most were part of normal cruise activity; others were specific to VOI. For example, in one test we used the thrusters instead of the reaction wheels to change the spacecraft's attitude—which is what will occur before VOI."

Finally, in late June, the team will conduct a VOI Operations Readiness Test, a ground simulation involving the entire Jet Propulsion Laboratory's flight team, including Martin Marietta's spacecraft team. Essentially it is a "hands on" test of the VOI operations procedures, which implement the flight command sequence reviewed in the April walk through.

"We will simulate the activities that will occur from several days before VOI through jettison of the spent solid rocket motor used to place Magellan

into orbit," Ledbetter explained. "We'll go through all the motions on the ground to transmit the VOI commands to the 'spacecraft' and then work through the VOI sequence."

In the training exercise, the team will face random anomalies—such as higher than expected temperatures on the spacecraft—which it must analyze and correct. "The intent," Ledbetter

said, "is to determine how the flight team will respond in any random situation and take the proper corrective action."

What lies ahead . . . mapping, another trajectory correction

May: Sandwiched between VOI tests, the spacecraft team will turn on Magellan's synthetic aperture radar and "map" space. During the test, the spacecraft will point and turn as though it were mapping Venus—changing its orientation to map the "surface," then maneuvering to point its antenna to Earth for data transmission. With a second maneuver, the spacecraft will aim its star scanner toward a pair of guide stars and update its attitude. While the radar will send out pulses, no science data will return because, theoretically, there is nothing

in space to bounce back echoes of the pulses. In effect, the data sent back to Earth will be blank. However, the tests will return engineering data showing how the mapping procedure is working. The radar will be turned off at the end of May. The test will last about 10 days.

June: VOI Operations Readiness Test scheduled late in the month.

July: On July 25, the spacecraft team will fire Magellan's thrusters to correct its trajectory and place it on the

final approach to Venus. This third and final trajectory correction maneuver is expected to require only a minimal amount of fuel, leaving more for extended mapping operations.

August 10: Venus Orbit Insertion (VOI) and solid rocket motor separation. After VOI, the spacecraft team will turn on the radar, run a series of equipment calibration and radar tests, then conduct an orbit trim maneuver to adjust the orbit parameters to optimal conditions for mapping.

September: Venus mapping begins.

Science Focus: Washington University's Dr. Raymond Arvidson

As Magellan travels through space, a team of scientists here on Earth anxiously awaits its arrival at Venus and commencement of mapping activities.

One of those scientists is Dr. Raymond Arvidson of Washington University in St. Louis, who is part of the Magellan radar investigation group and director of the University's remote sensing laboratory. The laboratory is one of 13 NASA Regional Imaging Facilities and home to an archive of planet photographs and digital maps used by scientists throughout the world.

For the Magellan mission, the laboratory is one of five centers that will house a collection of radar images of Venus. The others are the Jet Propulsion Laboratory (JPL) in California, the United States Geological Survey in Arizona, the Massachusetts Institute of Technology in Cambridge, Mass., and Brown University in Rhode Island. The National Space Science Data Center in Greenbelt, Md., will house a complete set of images once the Magellan mission is concluded.

Once images are received at the centers, they will be computer-interpreted and assembled to make global maps of Venus that will help scientists explore possible volcanic activity, changes in the planet's climate, and similarities between Venusian and Earth surfaces.

Magellan, with its high-resolution imaging, may prove that there are active volcanoes on Venus. "Previous tests have revealed an abundance of sulfuric acid in the Venusian atmosphere," Arvidson explained. "Something is putting sulfur in the air right now, perhaps volcanoes."

Magellan data may also show whether the mountain ranges of Venus, like the Earth's, resulted from plate tectonics or whether some other process was involved.

Also of interest is the "runaway" greenhouse effect on Venus. Ninety-seven percent of the planet's atmosphere is carbon dioxide, which traps heat and evaporates water. If Venus and Earth are alike in size, age, and composition, what happened to the water on Venus? "We will examine the Magellan data for evidence of ancient stream and river beds and for other clues that might indicate climates that were different in the past," Arvidson said.

Arvidson and his colleagues plan to work with an advanced network of computers that will enable them to rapidly assemble, display, and analyze the Magellan data as they are beamed to Earth beginning in September. A network of as many as 10 computers will also help his laboratory speedily access and display the images.

Magellan Fact

- Magellan's orbit will come within 155 miles of Venus at its closest point (periapsis) 10 degrees north of the equator, and 4,977 miles at its most distant point (apoapsis). The spacecraft will complete one orbit every 3.15 hours.



The Magellan Mission Bulletin is published aperiodically by Martin Marietta Astronautics Group public relations department. Inquiries should be referred to: Martin Marietta Public Relations, Mail Stop DC1020, P.O. Box 179, Denver, CO 80201, (303) 977-5364

Falcon House razing explained

(Editor's note: The following letter was sent this week to David B. Peak, district manager for the Ken Caryl Ranch Metropolitan District, stating the Astronautics Group's position on this week's razing of the Falcon House on Martin Marietta property near the Deer Creek Facility.)

Dear Mr. Peak:

We appreciate the time and effort you and others have put in developing a proposal to save and restore the Falcon House. Nevertheless, after careful consideration of your proposal, we have decided to raze the structure, as well as the smaller house near it. We are doing this because our present plans call for no development on land we own on the Ken Caryl Ranch. As we see it, any use of the Falcon House, including your proposed use as a community facility, would be a first step in such development.

We do have appreciation for the historic character of the valley. As you know, we recently completed, as a public service, a 30-minute videotape history of the valley and the Ken Caryl Ranch property generally. We are delighted that the Manor House will be

preserved and soon open as a restaurant. We have an ongoing project of support to the archaeological digs on the property and expect that to continue indefinitely. Also, you were thoughtful enough to introduce us to Dr. Harry Morgan, principal of the new Bradford Elementary School on the North Ranch. We expect to set up some meaningful partnerships with the school, especially in math, science, and computer science programs.

The South Valley Road, of course, was an element of development in the valley, but we felt that it was absolutely necessary for the safety and convenience of our employees traveling to and from work. We envision the rest of the land as an informal nature preserve for the foreseeable future. Razing the Falcon House is necessary because it presents a potential liability because of frequent vandalism, which has made it something of an eyesore.

Again, we do appreciate your bringing this proposal to us. Please be assured we will continue to look for ways to work with both the Ken Caryl Ranch Metropolitan District and the Master Association on projects to help benefit the community.

Sincerely,

Arthur E. Koski
Director Public Relations

Employees ask, 'What's a Code 37?'

The Astronautics Group is working hard to reduce Code 37s—a major category of the defects reporting system of the Air Force Plant Representative's Office.

Specifically, Code 37s measure the adequacy of the Astronautics Group's control over conditions and practices that are not physically part of group products but may affect their overall quality. For instance, a Code 37 write-up might involve defective tools or equipment, electrostatic discharge controls, or housekeeping practices—all items that indirectly relate to products the Astronautics Group produces.

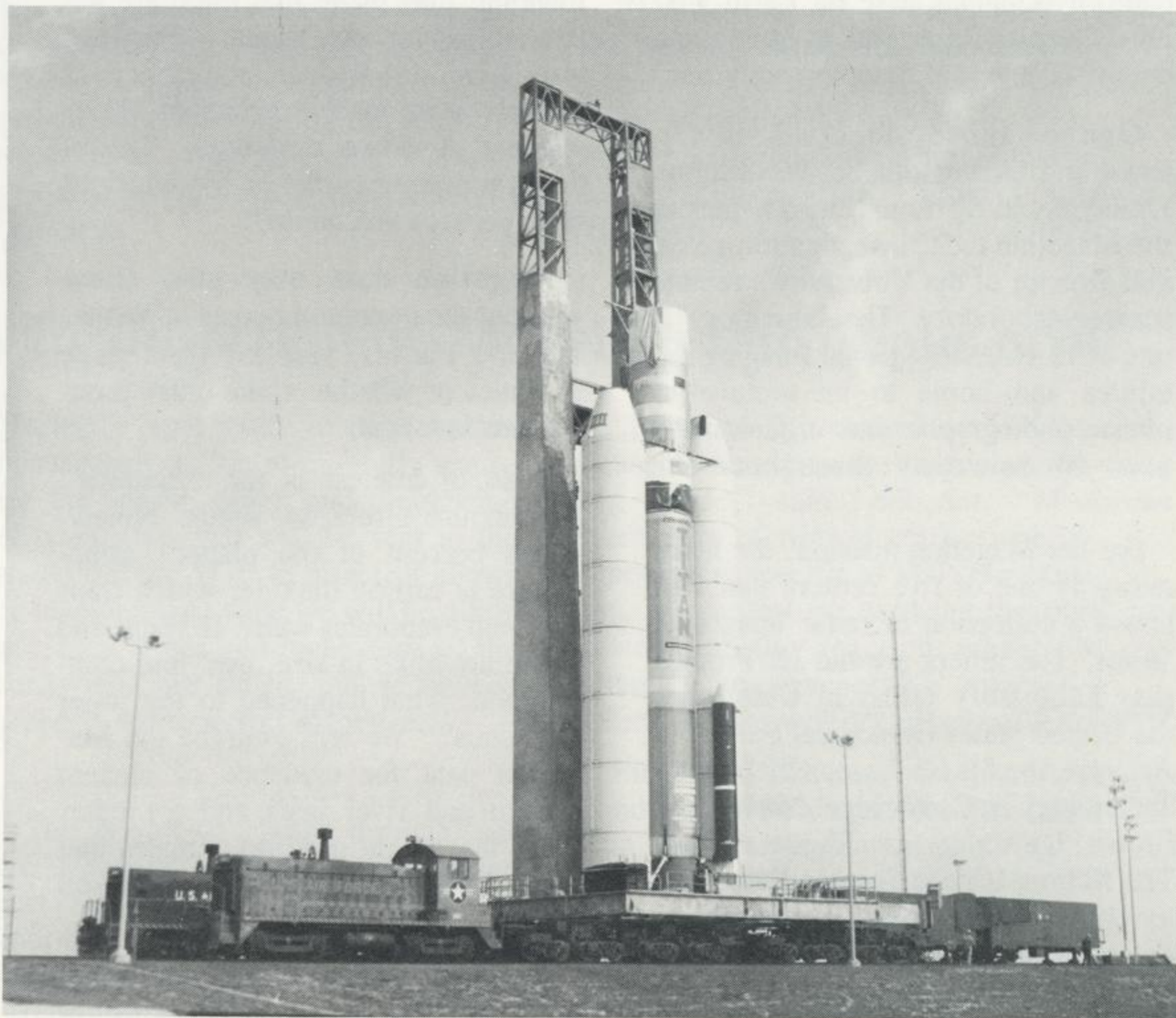
The Astronautics Group is compared with other companies in the Space and Missiles Commodity Group for the number of defects per 100 inspection hours. In 1989, the group averaged 20 Code 37 defects per 100 hours, while the commodity group average was 8.7 defects per 100 hours.

On the cover

The Air Force's Wright Research and Development Center has selected Space Systems to build SUPER, a survivable power subsystem for future satellites. SUPER consists of modular power assemblies and deployable solar arrays that will be able to withstand both natural and man-made hazards in space, such as debris, ultraviolet radiation, lasers, and projectiles. Under the Air Force contract, Space Systems will build hardware and provide operations support for a demonstration flight of the SUPER. In this artist's painting, SUPER is shown attached to a generic satellite.

Space Systems wins Brilliant Pebbles contract

The Strategic Defense Initiative Organization (SDIO) yesterday awarded Space Systems a \$2 million, eight-month contract to study concepts for Brilliant Pebbles, the small lightweight satellites proposed by SDIO and Lawrence Livermore National Labs as the space-based portion of the Strategic Defense System. In the Brilliant Pebbles concept, some 4,000 of these three-foot-long satellites would orbit the Earth, autonomously detecting hostile intercontinental ballistic missiles and attacking when properly released by U.S. authorities. The current contract is for a concept definition study and will focus on engineering designs for Brilliant Pebbles hardware that can be readily manufactured as well as systems concepts for implementing the Brilliant Pebbles program.



Commercial Titan rolls to pad

On May 7, the third Commercial Titan was moved from the Solid Motor Assembly Building to Launch Complex-40 at Cape Canaveral in preparation for launch next month. The Commercial Titan will launch and deploy an INTELSAT VI communications satellite for the International Telecommunications Satellite Organization. Commercial Titan, Inc., also is scheduled to launch the Mars Observer spacecraft for the National Aeronautics and Space Administration in September 1992.

Open enrollment for savings plans continues

Employees may enroll in or modify contributions to the Performance Sharing Plan (PSP) for salaried employees and the Savings and Investment Plan (SIP) for hourly employees through the end of May.

Changes in the percentage of payroll deductions and changes in before- or after-tax contributions may also be made during this period. All enrollment changes become effective the first full pay period in July.

Forms are available at:

- Deer Creek Facility, Benefits Office, Third Floor, South Elevators
- Electronic Manufacturing, Lunchroom Entrance

- Greenwood Commons, Guard Station, Building 6050
 - Littleton Systems Center, Room 201
 - Viewpoint I, Benefits Office, Suite 206
 - Waterton, Orb, Second Floor, between Administration and Engineering Buildings
 - Space Support Building, Room 607
 - South Park West I, Room 110
 - South Park West III, Lobby
- Completed forms should be sent to the Deer Creek Benefits office, Room 3B409, Mail Stop DC1343. Enrollment forms will not be accepted after May 31.

Company mourns loss of Davis

The Candy Man performed for more than 2,200 Peacekeeper employees on Oct. 3, 1986, at Boettcher Concert Hall in Denver and on Oct. 4 repeated his gig for 800 Vandenberg employees.

At the time, Sammy Davis Jr. was helping employees celebrate 100 percent Mission Success on the Peacekeeper program. Now, the Astronautics Group mourns his May 6 passing, and praises Davis' six-decade career as a singer, dancer, and actor.

Employee services/recreation

Colorado Corporate Games—The tenth annual Colorado Corporate Games are slated for Friday and Saturday, June 8 and 9. More than 120 employees will participate as athletes or volunteers at several locations. Spectators are encouraged at any of the following events:

- Track, 5:30 p.m. Friday at Jefferson County Stadium, W. Sixth Ave. and Kipling;
- Volleyball, 5:30 p.m. Friday at Green Mountain High School, 13175 W. Green Mountain Drive; and Saturday at Colorado Sports Complex, 5555 W. Evans (Evans and Sheridan);
- Tennis begins at 6 p.m. Friday and continues on Saturday at Morris Park, 20th and Allison, and Lakewood Park, Kipling and Cedar;
- Bowling, 9 a.m. Saturday at Holiday Lanes, 10350 W. Colfax;
- Bicycle time trials, 8 a.m. Saturday at the Denver Federal Center, Second and Kipling, followed by the criterium races at 10:30 a.m. Enter through Gate 1;
- 5K Race and Racewalk, 9:30 a.m. Saturday at the Denver Federal Center, Second and Kipling. Enter through Gate 1;
- Swimming, 9 a.m. Saturday at Green Mountain Recreation Center, 13198 Green Mountain Drive;
- Trap Shoot, 9 a.m. Saturday at Mile Hi Shooting Park, 1745 Highway #7, Erie, Colo.;
- Golf, 10 a.m. Saturday at Foothills Golf Club, W. Hampden and South Carr Street; and
- Racquetball, 1 p.m. Saturday at The Point Athletic Club, 533 VanGordon St.

For more information, contact Employee Services at Ext. 7-6605 or 7-6750. Employees, families, and friends can still sign up for the open events that include indoor and co-ed soccer, two-man volleyball, and horseshoes. These events are not a part of team scoring

and have separate entry fees. Obtain entry forms from the Employee Services office by May 31.

Racewalkers—Employees still are needed to be racewalkers in the Corporate Games on the morning of June 9 at the Denver Federal Center. Interested employees should call Art McFarlane at Ext. 7-7955.

Mile High L5—The group will meet at 7 p.m. Monday, June 4, in the first-floor meeting room of the Public Service building at Kipling and Hampden. For details, contact Mark Schloesslin, Ext. 1-9057 or 779-5692.

Saddle Club—Ridge Riders club members will meet at 7 p.m. Tuesday, June 5, in the recreation area clubhouse. For details, contact Mary Smith at Ext. 1-8154 or Irene Woodzell at 688-9676.

Waterton Amateur Radio Society—All hams and those interested in learning more about amateur radio are invited to attend the meeting at 5 p.m. Tuesday, June 5, in the hamshack at the recreation area. For more information, call Tony Kehayas at Ext. 7-2013.

Motorcycle Club—The Aerorider Motorcycle Club will meet at 5 p.m. Thursday, June 7, in the recreation clubhouse. Contact Steve Taylor, Ext. 7-2731 or Paul Betthausen, Ext. 1-5574 for information.

Classic Car Exhibit—A classic car exhibit of vehicles owned by Martin Marietta employees will take place from 11:30 a.m. to 12:30 p.m. and 4:30 to 5:30 p.m. Friday, June 8, at the Deer Creek Facility in the south center level parking lot. Employees interested in displaying their car or truck (classic, antique, muscle, or vintage) should call Clark Benson, Ext. 7-7306, by June 1. Proof of insurance is required to participate.

Hunting and Fishing—The group will meet at 5 p.m. Monday, June 11, in the clubhouse at the recreation area. For more information, contact Mel Smith, Ext. 1-8682.

Red Rock Bowmen—Archery club members and prospective members are invited to meet at 4:45 p.m. Tuesday, June 12, in the

clubhouse at the recreation area. For details, contact Dave Unruh, Ext. 7-0477.

Crab Feast—The Martin Marietta Chapter of the National Management Association is planning an old-fashioned crab feast for the afternoon of Saturday, June 16, at Stern Park in Littleton. Watch the information racks for more information.

Grand Prix of Denver—Forms to order discount tickets by mail will be in the information racks after May 31. Order forms must be postmarked by July 1. Tickets for Aug. 25 are \$21 and are good for any grandstand seat. Weekend package tickets are \$53 and include open grandstand seating on Aug. 25 and a reserved regular grandstand seat on Aug. 26. Employees are advised to mail in order forms as soon as possible.

Summer Camp Discount—Flyers are in the information racks describing a special corporate rate of \$75 per week at Pier Point Sports Camp in Aurora. The camp is for boys and girls, ages 5 to 14, and operates weekdays between June 11 and Aug. 17. Children must be enrolled for a minimum of two weeks.

Smoking Cessation Classes—Smoking cessation classes continue in June and July at the Deer Creek Facility, Monarch Room. The June class consists of four meetings from 5 to 6:30 p.m. on June 11, 14, 18, and 21. This program is free to all employees, spouses, dependents, and Air Force personnel. Registration forms are in the information racks and should be mailed to Employee Services one week before the first meeting of the class. Questions should be directed to Ext. 7-6605.

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