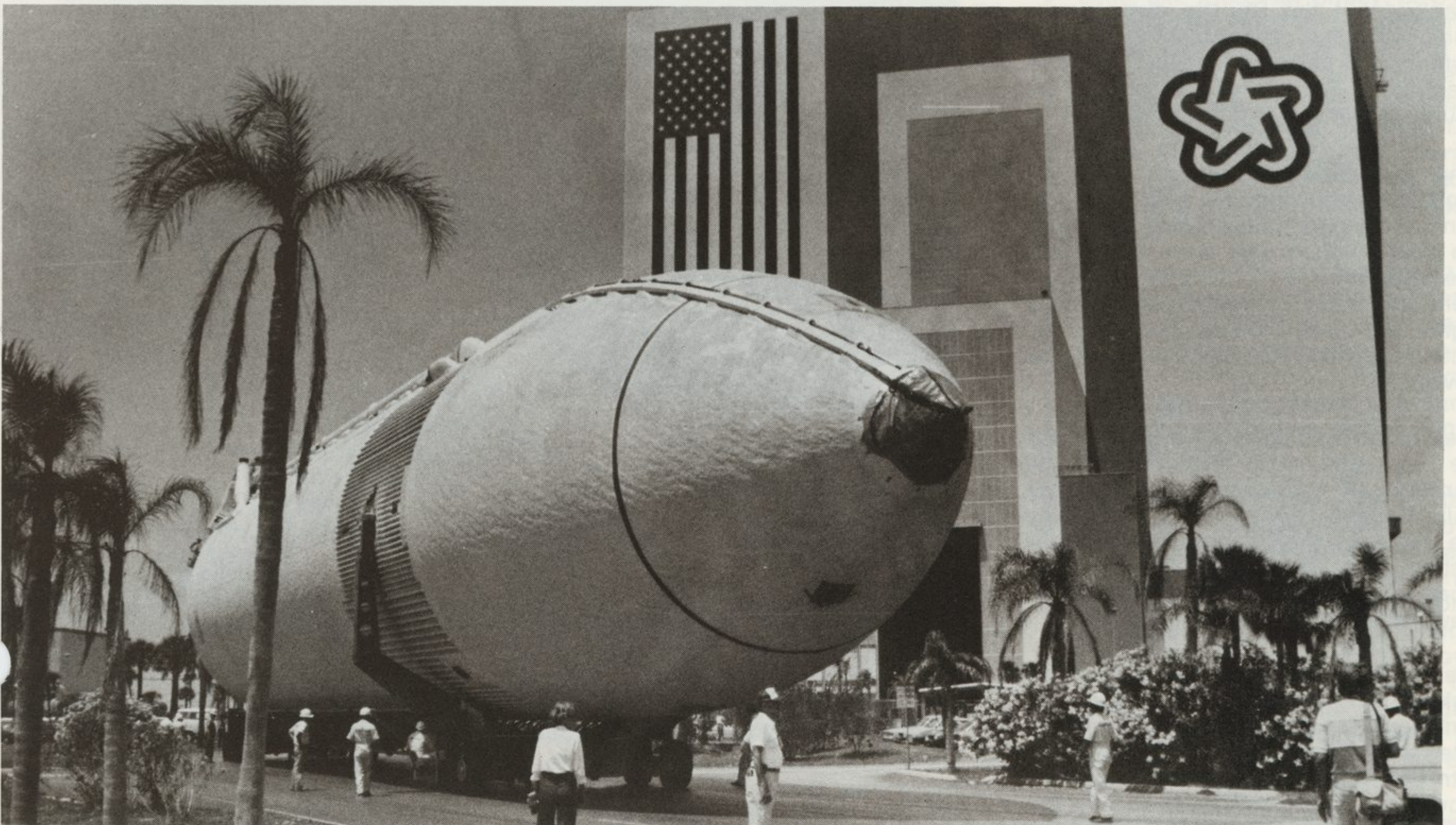




NUMBER 6/1981

MARTIN MARIETTA
news
DENVER AEROSPACE



Shuttle elements perform with near-perfection: Hurtt

Denver Aerospace President C.B. Hurtt has congratulated the thousands of employees who had a role in developing and producing the many systems built for Space Shuttle.

In a message following the successful mission, Hurtt said, "Your continuing dedication to mission success was never more dramatically demonstrated than by the launch of the Columbia and the perfect landing of the orbiter. All of our systems performed with near-perfection — the tank, the CCMS, the parachutes for the solid rocket boosters, the caution and warning and reaction control systems on-board the orbiter, and the numerous pyrotechnic initiator controllers."

The external tank, produced by the Michoud division, is the largest element of the Shuttle. It contains the propellants that feed the orbiter's three main engines at launch and is the structural backbone of the system in the launch configuration.

At liftoff, the external tank absorbed the total thrust loads of the three main engines and the two solid rocket motors. It separated from the orbiter after eight and one-half minutes of flight and fell fragmented into the Indian Ocean. It is the only major expendable component of Space Shuttle.

The checkout, control, and monitor subsystem (CCMS) was part of the launch processing system that manages all Shuttle ground activities up to the point of liftoff. The CCMS automatically checked out the Shuttle during pre-launch activities, checked out major subsystems and payloads before they were attached to Shuttle, and monitored all Shuttle systems up to the point of launch.

When the solid rocket boosters were jettisoned after burnout, the SRB deceleration system parachutes eased them into the ocean where they were recovered. The SRBs returned to land for refurbishment and reuse on subsequent Shuttle flights. Elements of the deceleration subsystem are interchangeable to facilitate salvage.

The caution and warning system provides the flight crew with audio and visual warnings of any system malfunctions while in flight. The warning is essentially the same as the hazard light/buzzer system in an automobile, although far more complex and far more critical for crew safety in the vacuum of space.

The reaction control system propellant tanks provide fuel to the orbiter's reaction control system thrusters during the abort, external tank separation, and orbital and entry phases of the mission. The thrusters provide roll, pitch, and yaw control for the orbiter and three-axis translation.



The Space Shuttle orbiter Columbia, with its landing gear in position, nears touchdown on dry lakebed at Edwards Air Force Base.

The pyrotechnic initiator controllers arm, fire, and disarm the Shuttle pyrotechnic initiators. The functions performed include separation of the umbilicals, solid rocket boosters, external tank and SRB nose cap, SRB nozzle severance, ignition, strut separation and parachute re-

lease, destruct of the SRB and external tank if required, activation of the orbiter fire extinguisher and remote manipulation systems, and provides the backup capability to force the orbiter's landing gear into position in case of hydraulic system malfunction.



The Earth serves as a backdrop for the silhouetted Columbia's vertical stabilizer and two orbital maneuvering system pods. The photo was taken through aft deck window of the flight deck.

Officials praise Shuttle mission

Congratulations on the successful Space Shuttle mission and the role of Denver Aerospace in its success have been received from many people in government and from the public. Here are four of the messages:

The successful launch, flight, and landing of Columbia ushered in a new space era built upon the hard work of many in American industry. Those efforts have shown the world that the United States is without doubt Number One in space.

You are to be congratulated for your essential part in the Space Shuttle project. Now we must build on this great success and on the capability that it demonstrated to make sure that we remain Number One.

Please convey my thanks and congratulations to all your employees.

*Ronnie G. Flippo
U.S. Congressman-Alabama
Chairman, Subcommittee on
Space Science and Applications*

Congratulations to you and your organization for the critical and significant role played in the success of the first flight of NASA's Space Shuttle. Although this was the first test flight, the mission was an astounding success. It was executed in "textbook" fashion with very few and minor anomalies, a compliment to the performance of the people at Martin Marietta Aerospace.

One has to marvel at the Columbia's success considering the complexity of the systems and the number of unknowns for a first manned flight. It is clear that the mission could not have been successful without the personal dedication, technical excellence, and

determination of many men and women at Martin Marietta. Many have devoted nearly a decade to this marvelous feat.

I believe the Nation will be stronger because of your contribution to this effort. Thank you.

*A.M. Lovelace
Acting Administrator
National Aeronautics and
Space Administration*

Congratulations on your very substantial part in the successful completion of the SST-1 mission. The preliminary data indicate near-perfect external tank performance. The diligence and technical excellence of you and your team provided a basis for the most significant step and will continue, I am sure, to serve us well in meeting the challenges ahead.

Please convey my personal congratulations and warmest thanks to all those at Martin Marietta who have contributed to this first of many successful STS missions.

*W.R. Lucas
Director
George C. Marshall
Space Flight Center*

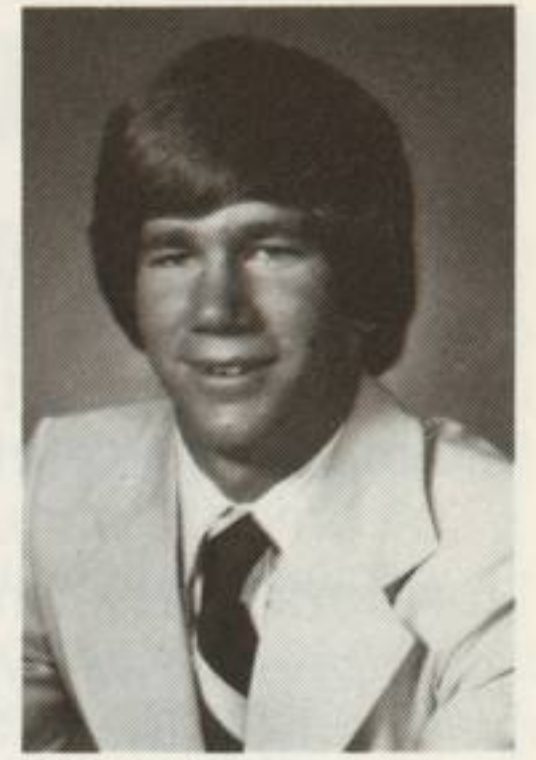
Now that lift-off and touch-down are successful dates in history, I know all of you must feel very proud of the involvement and contribution made in this thrilling achievement.

Congratulations and continued success in all your future endeavors with the program.

*Robert H. Shanahan
Co-publisher
Executive Vice President
The Denver Post*



Fagan



Gillespie

Two students earn scholarships

Two children of employees have been named to receive Martin Marietta Foundation scholarships for the 1981-82 academic year. They were named when previous scholarship winners declined to accept the awards.

Those selected were William M. Gillespie, son of the late Leland M. Gillespie and Mrs. Gillespie, of Denver; and Tracy K. Fagan, daughter of Mr. and Mrs. Michael J. Fagan, Jr., of Vandenberg Operations.

Young Gillespie's father was manager of compensation for Denver Aerospace at the time of his recent death. A graduating senior at John F. Kennedy High School, Gillespie wants to major in biochemistry at Johns Hopkins University in Baltimore. He is a member of the junior ski patrol, participates in other sports, and lists among his hobbies and interests bridge building and computer programming.

Miss Fagan, whose father is an engineer at Vandenberg, will graduate from Santa Ynez High School in June. She plans to attend California State Polytechnic University to major in computer science and mathematics. She has been active in athletics, in mathematics contests, and in 4-H.

The scholarships, initially for one year and renewable for three more years based on academic achievement, are for \$3000 each year.

FOS project earns performance award fee

The faint object spectrograph project has earned a performance award fee for the October 1, 1980 to March 31, 1981 evaluation period.

The award was announced by G.P. Himel, material manager for the University of California at San Diego.

In announcing the award, Himel said, "Progress reported for the period was impressive....The transition of program manager during the period was accomplished without problems, and cost management has been more effective. We now have a dedicated team at Martin Marietta for FOS, and the results of their efforts were quite evident this period."

On the cover

The external tank for the second Space Shuttle flight arrived at Kennedy Space Center aboard the barge Orion April 22. It had left Michoud April 17. It was moved from the barge to the vehicle assembly building to be prepared for mating with the orbiter. The second Shuttle flight is tentatively scheduled for October.

'Metallurgy awareness' is special meeting topic

The Rocky Mountain Chapter of the American Society for Metals will present a special "Metallurgy Awareness" program Thursday, May 14, at 6:30 pm. The meeting, which is open to the public, will be held at the Applewood Inn, 14001 W. 32nd Ave.

MARTIN MARIETTA NEWS
Published by Public Relations
MARTIN MARIETTA AEROSPACE
Call Ext. 5364 with suggestions
for information or articles
Denver Aerospace
P.O. Box 179 • Denver, CO 80201
May 1981

Technical show displays to feature Denver systems

Scientific instruments, large space systems, the manned maneuvering unit, command and information systems, and solar energy systems produced here are being exhibited at two national and two international technical shows.

The nephelometer and atmosphere experiments for the Galileo Jupiter probe, the MMU, and solar energy systems are being exhibited at both the American Institute of Aeronautics and Astronautics meeting in Long Beach, CA, May 12 through May 14, and at the Paris Air Show, June 4 through June 14.

Large space systems are the centerpiece of the AIAA exhibit, with a one-third scale, 15-foot cube on display.

A slide-tape show on the Venus orbiting imaging radar spacecraft will be shown continuously in a small theater that is part of the AIAA display.

A key element of the Paris Air Show is a demonstration of computer modeling of tactical air planning and management problems. A television presentation and a three-dimensional display will show how information requirements can be defined for any tactical air situation using techniques developed here in the command, control, and communications laboratory.

In addition to exhibits at the AIAA and Paris Air Show, solar energy programs were exhibited in Mexico City April 28 through April 30 at Energia Solar '81. Photovoltaic power systems are also being shown at a Photovoltaic Specialists Conference being held in Orlando, FL, May 11 through May 15.

U.S. Savings Bonds campaign begins June 1

The annual Denver Aerospace U.S. Savings Bonds campaign will be held June 1 through June 26. Department coordinators will meet at 9 a.m. May 27 in the engineering presentations room to prepare for the campaign.

Employee participation in the program has been more than 90 percent in the payroll deduction program for many years. Last year was an exception, according to Leroy Hollins, who coordinates the campaign. Only 74 percent of employees authorized deductions for bond purchases. "We expect that the 1981 campaign will again see participation above 90 percent," Hollins said.

Bond interest rates have been improved. Those held to the 7-year, 10-month maturity will earn 9 percent; those redeemed after five years will earn the interim rate of 8.5 percent; those held only one year will earn 6 percent.



Highbay steel structural work on the Space Shuttle's orbiter maintenance and checkout facility on North Vandenberg Air Force Base is being checked by Paul B. Cusick, senior field engineer for construction surveillance at Vandenberg operations. The foundation work, which included the 50-foot deep payload deservicing pit, was completed in November 1980. The facility will provide for gaseous nitrogen, helium, oxygen, and hydrogen servicing; hydraulics and fuel cell coolant loop servicing; environmental control and life support system water and freon servicing; installation of payloads and deservicing of returned payloads; and thermal protection system maintenance. Work on the facility will be completed in early 1982.

Shrine circus day set June 13 for employees, families

Two performances of the El Jebel Shrine Circus will be held exclusively for Denver Aerospace employees and their families Saturday, June 13. The shows, to be held at 10 am and 2 pm, are necessary because of the limited seating of the Denver Coliseum.

In January, several special events were offered employees and their families in celebration of the Denver Aerospace 25th anniversary. The circus is the second of these special affairs. Yet to come are two special nights at the Denver Bears, July 25 and 26, and the Family Day at Lakeside Amusement Park August 22. The first event, held in February, were special

Denver Nuggets basketball games. Employees were sent participation cards in January and asked to select two of the four events. Those who selected the circus as one of the events will have priority for tickets for the June 13 affair.

Department heads should have department administrators pick up circus tickets May 27 or May 28 between 9 am and 4 pm at the recreation office, Eng. 124. This will provide ample time for distribution to employees. Tickets not reserved, if there are any, will be allotted to departments for distribution on a first-come, first-served basis.

Fabrication complete for solar projects in Spain, Saudi Arabia

Fabrication and assembly of hardware has been completed for two international solar power projects in Spain and Saudi Arabia.

A. E. Hawkins, vice president of solar energy systems said manufacturing and shipping is complete for a 500-kilowatt solar thermal central receiver power plant under construction in Almeria, Spain, and for a 350-kilowatt photovoltaic power plant under construction near Riyadh, Saudi Arabia.

Mirror modules, manufactured in the Pueblo facilities, are assembled into heliostats — groups of 12 mirror modules mounted on a single pedestal. Heliostats are used to reflect sunlight onto a heat-absorbing, boiler-like device called a receiver. The heat is then used to create steam to generator turbines.

The photovoltaic modules, manufactured in Denver, are mounted on pedestals in groups of 32 to form a photovoltaic concentrator array. Each array, containing 256 silicon solar cells which create electricity when sunlight strikes them, is capable of producing up to 2.9 kilowatts of electricity.

In another solar project, Denver Aerospace is manufacturing mirror modules for the first solar thermal central receiver power plant in the U.S., near Barstow, CA. The "Solar One" plant, when it comes on line in 1982, will produce 10 megawatts of electricity—enough energy for about 2500 homes, said Hawkins.

In addition to heliostats, Denver Aerospace also will provide a computer control system to coordinate and operate the Barstow plant's entire heliostat field.

Software estimating topic for society meeting

William G. Cheadle, software estimating, will be the principal speaker at the May 19 dinner meeting of the National Estimating Society. The title of his talk is, "Software Parametric Predictive Resource Models." He will discuss a research program developed at Denver Aerospace to plan, schedule, and estimate software and the benefits of the program to software development.

The meeting will be held at the Rodeway Inn at Greenwood Village beginning at 6:30 pm.

The NES objective is to provide educational opportunities in estimating techniques and methods. Membership is open to all those interested in these techniques and methods.

Hurtt appointed chairman for savings bonds



C. B. Hurtt, president of Denver Aerospace, has been appointed to a two-year term as Colorado state volunteer chairman for the U.S. Treasury Department's savings bond program.

As chairman, Hurtt is responsible for promoting savings bond purchase through payroll deduction in business and industry and for over the counter sales at banks throughout the state. He has been the principal speaker at two recent bond campaign kickoff meetings. The first was for the drive among federal employees, both military and civilian, and the second was at a meeting of top management of major companies in the five-county Denver metropolitan area.

Four employees cited for rescue efforts

Four Kennedy Space Center operations employees have been commended for their assistance in rescue efforts when Rockwell employees were overcome in the nitrogen environment of the aft orbiter compartment.

The late February accident claimed the lives of two Rockwell employees.

Ronald Blackard, Richard Hare, Terry Jones, and Calvin Moser were leaving the launch tower when they came upon the accident scene. Although they did not know the nature of the accident or the danger they would be in, they proceeded to the platform and offered assistance.

Hare helped remove the injured men from the compartment and began mouth-to-mouth resuscitation on one of them. Blackard, Moser, and Jones administered an air mask to another man.

"We are proud to have people of this caliber in our work force," said Thomas C. Wirth, director of KSC operations, in commending the employees.

Planning underway for evening courses

Planning for the 1981 fall semester evening courses for employees is under way.

Employees who would like to propose and teach new aerospace-related courses may do so before May 22. Forms for proposing the courses are available from the training, education, and employee development office in the engineering building. Telephone extension is 5226.

Recreation

Information on all clubs and activities may be obtained from the recreation office, room 124, engineering building, Ext. 6750.

Recreation area—Organizations and employee groups planning to use the recreation/picnic area for social events should make reservations with the recreation office. A reservation card will be mailed to the requesting party for completion and return to the recreation office.

Parapsychology club — Guest speaker at the Parapsychology club meeting May 12 will be Suzanne Clair. Her topic will be Seth. The meeting, to be held at 5 p.m. in the sixth floor SSB presentation room, is open to employees and outside visitors.

Golf tourney—The partner best ball golf tournament will be held May 30 at the Lake Arbor Golf Course. Play is limited to the first 200 registrants. Entry deadline is May 15. The \$11 per player registration fee, which includes greens fees and electric cart, is due with the registration. Tee times will be assigned in order of registration and begin at 6 a.m.

Recreation representatives — Representatives for the recreation office have been assigned at various locations for the sale of discount tickets and distribution of recreation materials. Representatives are Nadine Holder, West Point module 363, ext. 7886; Rebecca Moore, Greenwood Commons building 6140, ext. 1555; Kay Shuey, DSC II, module 263, ext. 7467; Georganne Wood, Cinderella City I, 977-0511; Lucy Winka, South Lincoln, personnel office, ext. 2818; Karen Alamanza, Inverness, building 98 room 110, 740-3002; Lori Sharp, engineering, module 124G, ext. 6750; and Rita Soto, SSB-409, ext. 4742.

Golf league—A meeting of golf league chairmen will be held Tuesday, May 12, 3:30 p.m. in engineering building conference room 213A. A representative from each league should be present to ensure recreation office support during the 1981 season.

Stop smoking clinic—The Porter Hospital "Six-Day-Plan" stop smoking clinic has been scheduled for June. Sessions will be held June 1, through June 5 and June 8 from 4:45 to 6:15 p.m. in the sixth floor SSB presentations room. Employees may attend the first session to obtain information with no obligation to enroll in the clinic. Cost is \$54 per person. Registration will be at the first session June 1.

Construction starts on balance of MX test facilities

Construction is starting at Vandenberg Air Force Base on the rest of the facilities needed to support the first flight test of MX missiles in early 1983.

The contracts, which are expected to total approximately \$15 million, are being awarded by the U.S. Army Corps of Engineers. Martin Marietta Aerospace in Denver is responsible for establishing the design requirements of all MX assembly and test facilities at VAFB, and will also conduct the flight test program for the Air Force.

The construction work, which will continue over the next year and one-half, includes:

- One launch pad
- Fourth stage preparation and checkout facility
- Re-entry system assembly facility
- Rail transfer facility
- Twin stage processing facilities, and
- Missile stage storage facilities.

With the completion of these and four other facilities already under construction, the base will be ready for the first scheduled test launch of the MX.

The launch pad includes a launch support stand with a hydraulic system for elevating the missile to launch position, and an underground support room for launch support electronic and mechanical equipment.

A 15,300-square foot building is being built for preparation and checkout of the missile's fourth stage, with its guidance and control, electronics, propulsion, and re-entry systems. A distinctive feature of the building is a 35-foot-high anechoic chamber used to test the missile's RF systems.

An existing 19,800-square foot building at Vandenberg Air Force Base will be modified for assembly of the missile's re-entry system, which includes the shroud and 10 inert re-entry vehicles.

The rail transfer facility will receive missile stages, the missile canister, stage transport vehicles, and other large equipment.

Two identical stage processing facilities, each with 3900-square feet of floor space, will be built to check out the large, first, second, and third solid propellant stages of the MX and to install components of the instrumentation and flight safety system.

The stage storage facility, comprised mostly of earthen embankments, a loop road and parking pads, will provide short-term storage of the first three missile stages and the stage transporter vehicle.



Vandenberg Air Force officials watch as a "topping-off" ceremony is held at missile assembly building. The American flag flying atop the last beam to be put in place was provided by Col. John N. Shults, the base commander.

Astronauts thank Michoud employees

Robert F. Hieter, production operations director at the Michoud division, and the employees of his department recently received a letter signed by astronauts John Young, Robert Crippen, Joe Engle and Richard Truly thanking them for their work. The letter said:

"Congratulations! The external tank performed like a champ because it was the result of your championship efforts. You each have contributed a valuable service to the four of us and an even more important task for America.

"The first flight was great. We anxiously look forward to the second flight and many more of equal success and importance.

"Keep up the good work."

Michoud and Kennedy Space Center (KSC) employees were also lauded by Michoud division vice president and general manager, Kenneth P. Timmons. "The successful launch of the first Space Shuttle was a proud achievement for NASA and all participating contractors. I know that the successful mission was built upon the long and weary hours you all worked willingly and well. I am proud of you. You have helped to open the door to a great future in space for our country."

Employee credit union names new manager

Ms. Barbara Bonn has been named manager of the Red Rocks Federal Credit Union by the employee-operated organization's board of directors.

She has been associated with credit unions since 1968, first with the Denver Public Schools, later with the Aurora Public Schools, and most recently with Safeway credit union in Denver. She has nine years of experience as a credit union manager.

She is studying for the professional certificate in credit union management.

Ms. Bonn is developing plans for a more efficient and effective credit union operation for members.

Vice president speaks at industry group meeting

Robert J. Polutchko, vice president for technical operations, reviewed the 25-year history of Denver Aerospace at the April 24 luncheon meeting of Industries for Jefferson County.

His talk included projections on plans for the future and a discussion of the Denver role in the highly successful Space Shuttle flight.

Polutchko is responsible for the research and development, engineering, and quality control functions.