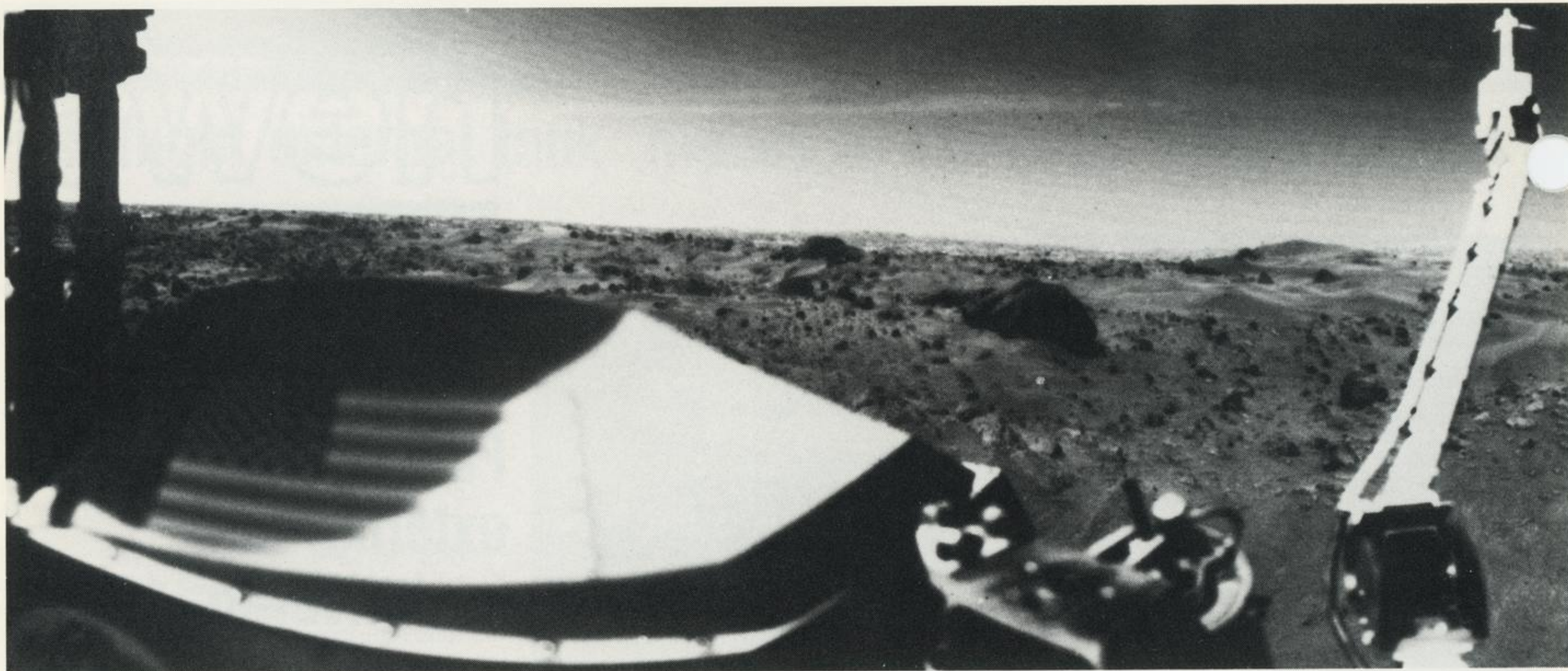


NUMBER 10/1979

**First flight
external tank
is delivered**





Viking Lander I rests on the Martian Plain of Chryse. In this photo, taken July 23, 1976, part of the lander is visible in the foreground. In the background, the rocky surface is covered by thick deposits of windblown material, forming numerous dunes.

Viking lander begins fourth year on Mars

The first Viking spacecraft to land on Mars began its fourth year of exploration of the Plain of Chryse Friday, July 20.

At 6:12 am (MDT) July 20, 1976, Viking lander I, built by the Denver Division, settled gently to the surface of the Red Planet, after an 11-month, 400-million mile journey through space. It was joined by its twin, lander II, September 3, 1976.

Originally planned for 90-day missions, both spacecraft are still taking the mea-

sure of the planet's frigid environment.

Exploring on opposite sides of the planet, the landers have returned more than 4,450 photographs (in color, black and white, infrared, and stereoscope); collected and examined 72 soil samples (more than five pints of soil); moved surface rocks; and recorded weather data.

C.B. Hurtt, vice president and general manager of the division, noting the anniversary, said, "The continued operation

of these two wonderful spaceships, after three years in the hostile environment, is a witness and a testimony to the technical skills and imagination of the men and women who designed and built them."

Lander I went on semiautomatic operation status February 23, and is expected to operate until 1990. Once each week it points its antenna toward Earth, ready to transmit information when commanded to do so.

Although lander II was expected to relay its last message to Earth in May, its useful life has been extended until at least August and possibly until December. It relays its data to Earth via the remaining Viking orbiter circling Mars. With only a small amount of attitude control gas remaining, the lone orbiter is not expected to function long after December.

Both landers are taking daily temperature, atmospheric pressure, and wind velocity readings. During the next several years information from lander I will be analyzed to determine variations in Martian weather patterns. Lander I also has been programmed to periodically photograph specific areas so that surface changes may be monitored.

Earlier this summer, lander II measured the Martian soil temperature and recorded a variation of -152°F to -196°F during the 24.67-hour day. It also used its sampler arm to build several small conical piles of soil to be observed to detect changes due to erosion.

The Denver Division designed and built the landers and the Titan IIIE launch vehicles that boosted the twin spacecraft on their journey to Mars, and participated extensively in the mission and surface exploration operations.

First share-the-ride applications being processed

Nearly 200 share-the-ride applications were received during the first week of the improved share-the-ride program. The applications are being processed through the Denver Regional Council of Governments (DRCOG) computer carpool matching system.

The DRCOG system will match drivers and riders according to work location, work hours, and home addresses. A list of other employees interested in ridesharing and with whom it would be convenient to form a carpool will be mailed to each applicant. Applications are processed each week.

Preferential parking areas are being established in 11 division parking lots, including those at the Federal Boulevard facility and the Denver Systems Center, and will open for use August 1. If a carpool member drives alone, he should park in regular parking areas, not in preferential parking.

The rescue system to aid stranded carpools began July 16 with a shuttle bus

leaving the main plant at 5:30 pm and following a route that connected with RTD bus stops as well as convenient pickup points for private transportation.

Applications for participation in the share-the-ride program are available at the share-the-ride office, engineering building 125.

New and established carpools should be registered with Beverly Thompson, the share-the-ride coordinator, at the share-the-ride office. Preferential parking decals will be mailed after the carpool is registered.

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 Denver Division
 P.O. Box 179 • Denver CO 80201
 July 1979



Laverne Starr makes as many as 3,200 changes to the division's telephone information each month.

New phone book costs less, is more current

The new division telephone book was produced for less than the cost of printing revision pages for the loose leaf directory and was published in less time, making it more current.

Elimination of the three-ring binders used since 1977 was necessary because they were too small to accommodate listings required by the increase in employment. Cost of replacement binders alone was more than the cost of the new format directory.

The directory was published by a Minneapolis firm from a computer-generated magnetic tape of division telephone listings.

"Although the directory was current when printed, we know changes occurred in the two weeks before it was distributed," John Hickey of telecommunications said. "We are processing 3,200 data changes each month to keep up-to-date for information operators. Even with that many, we know we are not getting all the changes. Employees simply do not file changes when they should."

Of the 50,000 calls processed each month by the operators, about 8,000 are for information and assistance.

"That is why we ask employees to send us location, mail number, or extension number changes immediately," Hickey said. "We especially need the changes before each directory revision."

It is anticipated that new directories will be published quarterly, each at less cost than separate revision pages and without the need for employees to insert the pages in a binder.

Employees with questions, comments, or suggestions on the telephone directory should call Hickey on extension 5411.

Employees asked views on credit union

Division employees are being surveyed to determine the need for a credit union. The survey is being mailed to employees' homes by the division's employee relations department. If survey results indicate a substantial interest, the department will assist in the formation of an employee-managed credit union.

Employees are urged to answer the three-question survey and return it to employee relations, mail no. 6320.

Credit unions are self-help financial organizations, formed by a group of people who save money together and make low-cost loans to each other for worthwhile purposes.

1979 savings bond drive complete

More than 8000 Denver Division employees are participating in the U.S. Savings Bond payroll deduction program. This is an increase of more than 1400 participants.

The percentage of participation increased from 75 percent at the beginning of the campaign to 93 percent when the campaign was completed. Highest participation is at Canaveral operations where 98 percent are enrolled. Participation at Vandenberg and Michoud is 94 percent, and in Denver is 92 percent.

Corporation selects two firms for cement plant studies

The Corporation has selected two firms for preliminary engineering studies of a new cement plant in Utah.

LaFarge Consultants, Ltd., Montreal; and Fuller Company, Catasauqua, PA, won the contracts and will complete their work by October 31. The contracts cover preliminary designs, schedules, and cost proposals for construction of a 500,000-ton-per-year plant.

Martin Marietta holds options from Stansbury Mining Co., Salt Lake City, on a site with limestone and other raw materials near Leamington, UT.

Martin Marietta now operates eight cement plants in the East, Southeast, Midwest, and Rocky Mountain markets.



Col. Gerhard L. Schopen, center, the Air Force Plant Representative, presents an Air Force Systems Command award to C. B. Hurtt, right, vice president and general manager of the Denver Division. At left is J. R. Grace, division director of materiel. The "Award for Exceptional Small Business and Minority Business Subcontract Programs," was presented for the division's increases in both small and minority business subcontracts. Only seven such awards were made in the nation by the Air Force.

Company publication, stamp collecting lead employee to Clipper research

His stamp-collecting hobby and the gift of a "whole stack of *Martin Star*" have led John J. Shaughnessy to a research project on the Martin-built Clippers, flying boats operated by Pan American Airways.

"A friend gave me about a five-inch stack of *Martin Star* dating back to the first issue published in February 1942," Shaughnessy said. "Reading them rekindled my childhood interest in the Clippers. I wanted to find out how they were built, what happened to them, and to acquire covers (mail carried on the flights) for my collection."

To aid in his research, Shaughnessy sought and got help from Melodie d'Guibert, who maintains the archives for Martin Marietta Corporation in Bethesda, and from Ann Whyte staff associate for research analysis and history for Pan Am. Each provided a "good deal of information." He also obtained a copy of *National Geographic* that had a story on a Clipper trans-Pacific flight.

According to Shaughnessy, a Denver Division financial analyst, Martin Marietta's predecessor company built three Clippers for Pan Am and two for Russia. The craft built for the U.S. airline were named the China Clipper, the Philippine Clipper, and the Hawaiian Clipper.

The China Clipper was delivered first, making its inaugural trans-Pacific flight November 22, 1935.

The Model 130, Martin's designation for the plane, was a four-engine flying boat that carried a crew of four and from 32 to 48 passengers. The crew consisted of two pilots, a flight engineer, and a wireless operator. The cabin was a cross between a luxury railroad sleeping car and an ocean liner, with lounge, dining area, and staterooms.

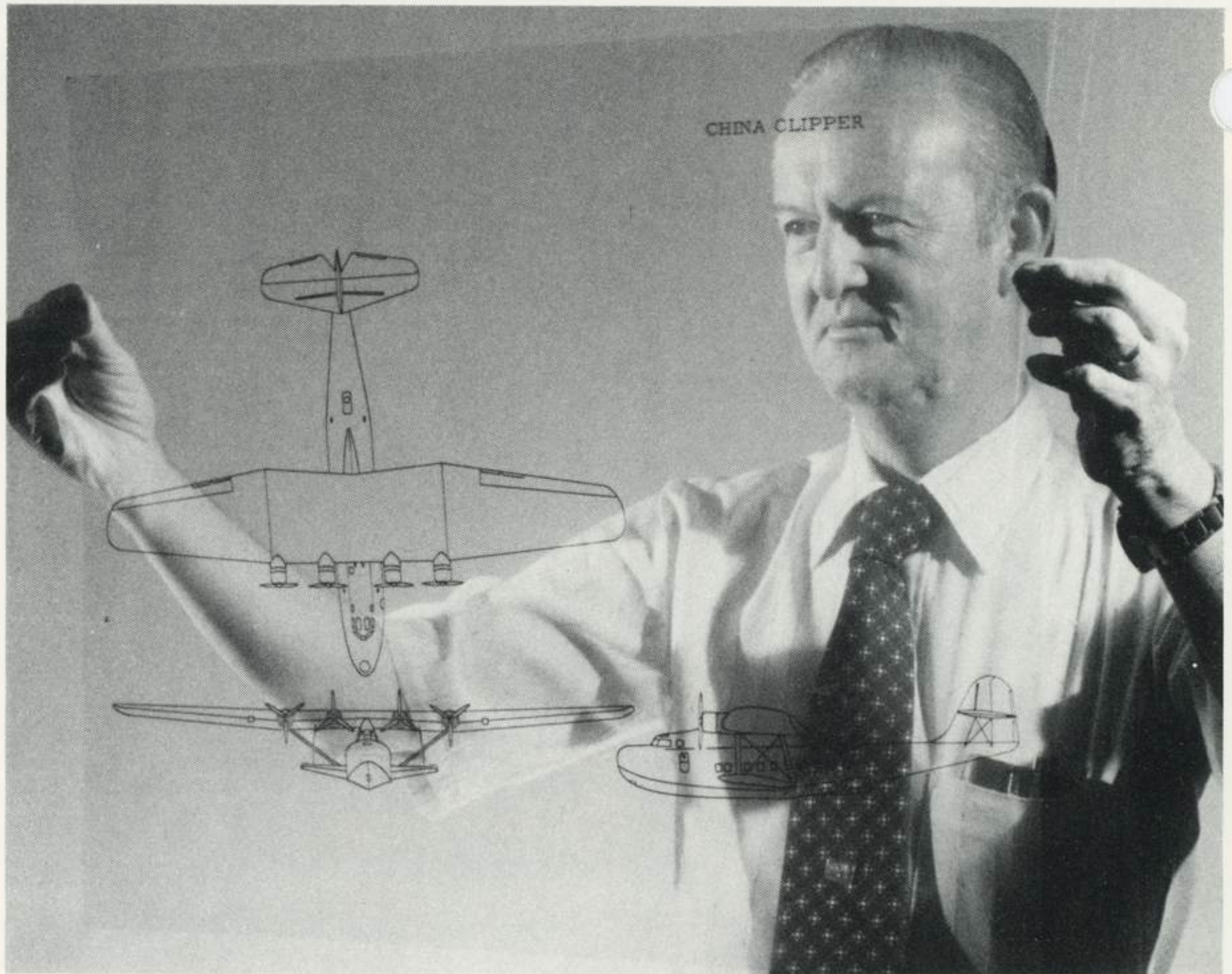
The Clippers had a maximum speed of 180 miles per hour and a flight range of 3200 miles.

The Hawaiian Clipper was the last to go into service and flew for the shortest time. It disappeared in January 1938 on a flight between Manila and Guam.

The China and Philippine Clippers became a part of the U.S. Navy during World War II, seeing service as both passenger and cargo carriers. The Philippine Clipper crashed in the mountains near Boonville, California January 21, 1943 while on a Navy flight from Honolulu to San Francisco.

China Clipper was returned to civilian use. It sunk after hitting an obstacle in the water while making a night landing off Trinidad January 8, 1945. It was on a flight from Miami to Leopold in Africa.

Shaughnessy isn't certain what he is going to do with all the data he has gathered, but points out that the 50th anniversary of the first Clipper flight will be in 1985. "Maybe I will do something that can be used as part of the anniversary."



John J. Shaughnessy with schematic of the China Clipper.

Recreation

Astronomy Club — Efforts are under way to form an Astronomy Club at the Denver Division. Purpose of the club will be to provide astronomers an opportunity to meet and plan activities, including the monitoring of special celestial events and the construction of a large planetary observation station. Roots for the club were established in the fall of 1978 when Larry O. Williams and C. Stephen Grant began planning for a February 1979 expedition to photograph the total eclipse of the sun. Those interested in participating in the club should call Grant at extension 4695.

Mixed Bowling League — The Martin Marietta mixed bowling league will begin play August 28. The league's 12 teams, each with two men and two women, will bowl at the Bellevue Bowl-A-Mat on Tuesdays at 9 pm. League play will continue for 35 weeks. Those who bowled in the league last year will have first priority for league membership, but each must complete a registration form to insure a position in the league. Employees interested in bowling in the league, either as a regular team member or as a substitute, should fill out a registration form and return it to the recreation office by July 27. A meeting of all interested bowlers will be held July

31 at 3 pm in the engineering building presentation room to elect league officers and discuss by-laws for the 1979-80 season.

Golf Tournament — Arrangements have been completed for the 1979 Martin Marietta open golf tournament to be held Saturday, August 18 at Lake Arbor golf course, 8400 Wadsworth. Play is limited to 160 employee golfers and entries will be accepted on a first-come first-served basis. Entry blanks are available in the display racks in all buildings and at the recreation office. Entry forms should be returned to the recreation office, mail no. 6320, before August 1. The \$7.00 fee per golfer, which includes a cart, should accompany the entry. No entries will be accepted after August 1. The shotgun start is scheduled for 7 am. All participants should arrive no later than 6:15 am in order to be at the assigned starting tee by 7 am. The Calloway handicap system will be used for scoring.

Discount Tickets — The recreation office has discount tickets for professional sporting events, amusement parks, theaters, and restaurants. Information may be obtained by calling extension 6750 or by stopping at the office, engineering building 125.

At Michoud

Michoud welder combines job, home

"If you don't mind getting your hands dirty, you can be a welder," according to tooling welder Sandra Morgan at Michoud operations.

As welder for the past three years, Mrs. Morgan shares the first shift with 10 other welders, all men. "It's fun to talk shop with the men," she said. "But there are times when I need to let them have some privacy."

The 38-year-old welder is also a mother of six children ranging from 8-year-old twins to a 17-year-old daughter.

Her responsibilities at Michoud include studying blue prints and cutting tools in the plasma arc area and welding tools used to build the external tank.

"Actually, being at home with my children for so long prepared me for my work in the plasma arc," she explained. "In that department you work on your own with little supervision, the same as a housewife does if she wants to get the work done."

"At first it was pretty hard getting used to the grinder and the disc sander," she said. "The noise really bothered me."

Since cranes are used to pick up heavy plates and other materials, Mrs. Morgan doesn't have to rely on the brute strength of her fellow employees to move welded equipment.

"I still get plenty of exercise on the job," she said, describing how she often has to climb on a table to cut parts from a 4 x 6 feet metal plate.

Mrs. Morgan says another advantage to being a welder is that she saves money on clothes. At first she wore green overalls as many of the men do. But now she wears jeans and a smock top.

"The men in my department thought this was a great improvement," she added. She is easily distinguished by her bright red welder's shield which she painted to "look prettier than the standard black shields the men wear."

Running a home and taking care of six children is a breeze, she says. She and her oldest daughter prepare meals on the weekend for dinner during the week. When she leaves the house for work at 6:30 am she awakens her oldest child who then gets up the others at 7 am and sees that they leave the house on schedule.

Although it seems virtually impossible for someone with a demanding job and six children to have free time, Mrs. Morgan manages to go roller skating, play tennis, and go to the movies a lot.

"With a family the size of mine, when we see a movie it's at a drive-in. It's a lot easier and less expensive to pile everyone in the car and go."



Welder Sandra Morgan

At Vandenberg

GSS milestone met at Vandenberg

Recent activation of the initial Vandenberg launch processing system (VLPS) for the Department of Defense space transportation system marked another milestone for the ground support systems operation. Equipment installed at the North Vandenberg control center includes partial delivery of the checkout, control, and monitor subsystem (CCMS) produced by the Denver Division.

Development and verification of unique process control software will be handled by the completed VLPS. Following software development and integration of NASA-provided software, the VLPS will become the operational control system for the automated ground processing and launch control of the Shuttle vehicle.

Seventy-five operational positions will be housed at Vandenberg—30 at the north control center and 45 at the south side.

May Titan launch is 70th consecutive

The May 28 Titan III launch was the 70th consecutive successful launch by the division's space launch systems Western Test Range team.

"These seemingly commonplace successes are not common at all," C. E. Carnahan, vice president for space launch systems, said. "They are the result of a dedicated and hardworking Titan team."

"For this enviable record, I would like to offer my sincere appreciation and thanks to all who are or have been a part of the team."

Richard J. Davis, left, and Jerald L. Perdue, right, Vandenberg launch processing system master console operators are running a checklist at the consoles. The consoles currently are used to supervise and monitor the status of the various Shuttle hardware systems, to track the associated ground support systems, and determine disposition of software.

At Canaveral

12 honored for service at Canaveral operations

Twelve Canaveral operations employees were honored recently for completing 40 years or more service with Martin Marietta. The dinner was hosted by the Canaveral operations Quarter Century Club. Eleven were recognized for 40 years service and one employee was cited for 43 years service.

Receiving 40-year award plaques from the club were Stephen A. Androsko, Russell E. Crouse, Emil J. Janda, John E. Kaminski, John G. Krall, Ernest Krouse, H. Ritchie McConahy, James M. Peters, Kenneth W. Traut, John W. Webster, and Harold A. Wilmer. John R. Konarski received a special award for 43 years service.

Those with 40 years service were also honored at a luncheon at which they received the Martin Marietta Corporation's 40-year service awards.

The Quarter Century Club of Canaveral operations was formed in August 1974 with 25 charter members. Twenty employees have joined the club since 1974. James Stacharowski is the club's president.

Scheffler honored by AIAA, United Way

Felix J. Scheffler, director of Canaveral operations, has been honored by two organizations of which he is a part.

He has been advanced to Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). He is in the second year of a three-year term on the AIAA national flight test committee.

The United Way of Brevard County has presented Scheffler its community service award for contributing outstanding management techniques that helped the organization exceed its 1978-1979 goal. He is a member of the organization's board of directors.



First flight external tank moves to Kennedy Space Center

It was a clear, sunny day. More than 2,000 Michoud operations employees, NASA officials, and members of the press watched as the first flight Space Shuttle external tank rolled out of building 420, ready for its voyage to Kennedy Space Center.

James B. Odom, NASA external tank project manager, complimented employees on presenting a "very clean" tank. Odom was introduced by Kenneth P. Timmons, vice president and general manager of Michoud operations.

Richard Davis, program director, told employees they could look forward to the prospect of 400 additional tanks being required for the Space Shuttle program after the current contract with NASA expires. That contract calls for nine external tanks. Four have been completed — three test flight tanks and the first flight tank.

The first flight tank arrived at Kennedy Space Center July 6 and is being prepared for Space Shuttle's maiden voyage.

During the buffet served under the full-scale painting of the 155-foot long tank, employees were greeted by a huge banner that read: Congratulations. A Job Well Done.

Hurricane Bob puts Michoud emergency plan in motion

While most Michoud operations employees waited at home behind taped windows and doors, an emergency crew worked non-stop July 10 in anticipation of Hurricane Bob, first threat of the year.

A five-step hurricane emergency plan used during the June to November tropical weather season went into effect.

Condition Five: The hurricane's progress was monitored. It was established as a real threat. The emergency crew shifted to condition four when the hurricane was less than 72 hours away.

Condition Four: A general state of alert. Critical files scheduled to be moved to safety were identified. The hurricane plot was posted on bulletin boards. All facility equipment was tied down.

Condition Three: The hurricane was expected in 48 hours. Critical files were moved to upper floors to prevent water damage. Employees covered desks and other surfaces with plastic. Windows were locked, blinds were closed. Electrical appliances were unplugged.

Condition Two: Hurricane Bob was 24 hours away. Employees were sent home. The emergency crew took over.

Condition one was not necessary. New Orleans and Michoud escaped damage, except for broken tree limbs and debris scattered by wind and rain.



Pathfinder tests are successful

Final tests of the Space Shuttle facility verification vehicle (Pathfinder) at Kennedy Space Center were "a tremendous success," according to Thomas C. Wirth, director of external tank operations at the Florida center.

"We accomplished what we set out to do," Wirth said. "We verified the design of the facilities and the mechanical integration of flight type hardware."

Checkout began when the external tank was removed from the barge and transported to the vehicle assembly building for installation in the high bay 4 checkout cell.

When it was confirmed that the vehicle fit properly in the cell, cables and hoses were routed to simulated interfaces to verify proper lengths and adequate support. Internal and external platforms were installed and access verified.

After high bay 4 activities were completed, the external tank was moved to the adjacent storage cell for verification of fit checks.

While that work was in progress, the inert solid rocket boosters were being stacked on the mobile launcher platform in high bay 3. The external tank was then moved to high bay 3 and mated with the boosters.

Orbiter Enterprise was moved and mated to the tank, marking the first time the complete Space Shuttle vehicle was assembled.

Wirth's crew then verified that all platforms could be closed around the vehicles so

that tests could be run on the Shuttle system when hardware was in place.

"If we had been working with a fully equipped vehicle," Wirth said, "we would perform integrated tests to verify that all elements worked as a unit."

After the high bay tests, the Pathfinder was moved to pad A for further verification and fit checks. Major Martin Marietta efforts were to verify intertank access and external tank swing arm. Also verified was a method to inspect 100 percent of the external tank's thermal protection system while on the pad, a requirement prior to launch.

When the facility verification vehicle is removed from the pad, it will go to high bay 1, the other integration cell, to permit fit checks there. After this check, the vehicle will be separated and the Pathfinder external tank will return to Michoud.

Martin Marietta also is responsible for the propellant loading facility, as well as developing computer software that will control the loading of the vehicle. Two complex programs, one for the liquid oxygen and the other for the liquid hydrogen, will be executed and monitored by computer to assure that the vehicle is loaded properly.

The verification operation, in addition to checking facilities, provided excellent training for technicians and engineers.

"We are confident we will be able to proceed with our planned checkout of the first flight vehicle," Wirth said.