MARTIN MARIETTA
news
DENVER DIVISION

NUMBER 6/1976

Historic flag is raised

Division authors honored at luncheon

Howard A. Garcia and William J. Owen were named co-authors of the year at a recognition luncheon for division authors Friday, May 14. They were among 61 employees honored.

The co-authors were cited for their paper on "The Design and Analysis of a Novel Optical Sensor for High Altitude Navigation."

Garcia

Owen

Both are staff engineers. Garcia is in the mission operations and analysis section of mission operations and software department; Owen in the guidance and control section of the electronics department.

Others honored:

Distinguished Contributors: Peter W. Abbott, Lyle E. Bareiss, Floyd A. Blake, Frederick D. Day III, Douglas P. Diederich, Richard L. Donovan, Matthew S. Imamura, David H. Julseth, Robert L. Knickerbocker, Wendel J. Maegley, George Morosow, James L. Oberg, Ray O. Rantanen, Ernest B. Ress, Roger T. Schappel, and Lee A. Skelly.

Honorable Mention: John E. Anderson, Robert T. Anselmi, Lyle E. Bareiss, Stan Barrett, Floyd A. Blake, Shepard B. Brodie, Edward E. Buchanan, Tibor Buna, Bernard M. Burke, Patrick C. Carroll, Revis E. Compton Jr., William M. Cogndon, Frederick D. Day III, Joseph D. Doub, Ralph N. Eberhardt.

Dale A. Fester, Robert A. Homan, Ralph O. Hookway, Richard A. Jackson, Bruno J. Jambor, William A. Kamsler, Ted F. Kiefer, Edward J. Miller, Richard D. Moog, John M. Murphy, Joseph A. Muscari, Harlan S. Nassen, David W. Neiswander, P. Paul Plank, John T. Polhemus, Ray O. Rantanen, Ernest B. Ress, Michael W. Rossmon,

Ronald B. Schroer, Maurice J. Shumaker, Richard A. Skidmore, George W. Smith, Owen B. Smith, Erich L. Strauss, James R. Tegart, Donald A. Thomas, Preston E. Uney, Frank A. Vandenberg, Ashton J. Villars, Jack F. Wade, Laurence O. Williams, and William R. Wilson.

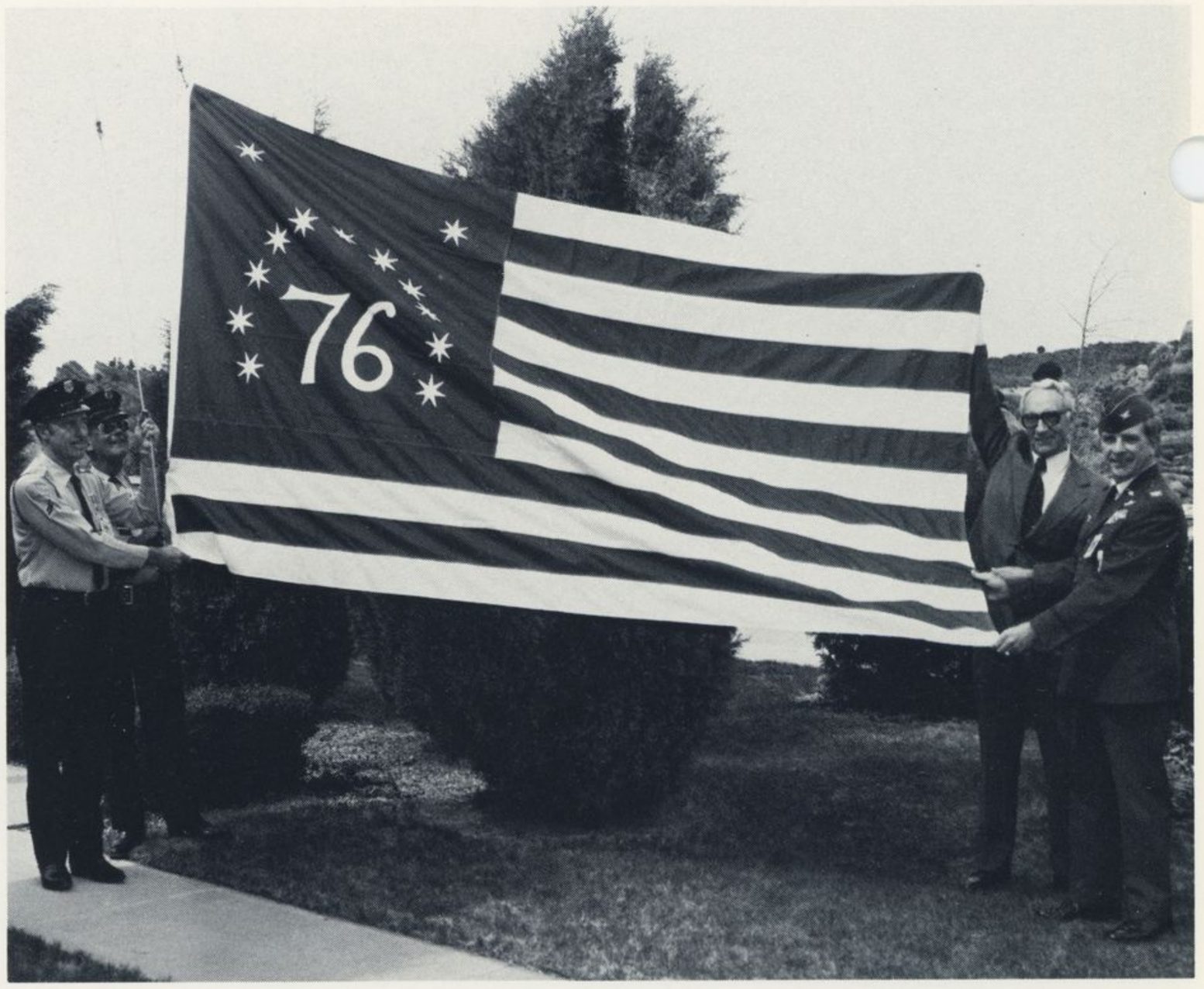
Historic flag presented by AFPRO

The Bennington flag, earliest known flag with 13 stars and 13 stripes, is now flying from the Denver division's flag pole. It was a gift from the Air Force Plant Representative Office (AFPRO).

The presentation, in celebration of the Bicentennial year, was made by Col. William A. Smith, Air Force plant representative, to L. J. Adams, division vice president and general manager.

The Bennington flag takes its name from the Battle of Bennington over which it flew in August 1777. The original is preserved in the museum at Bennington, Vermont.

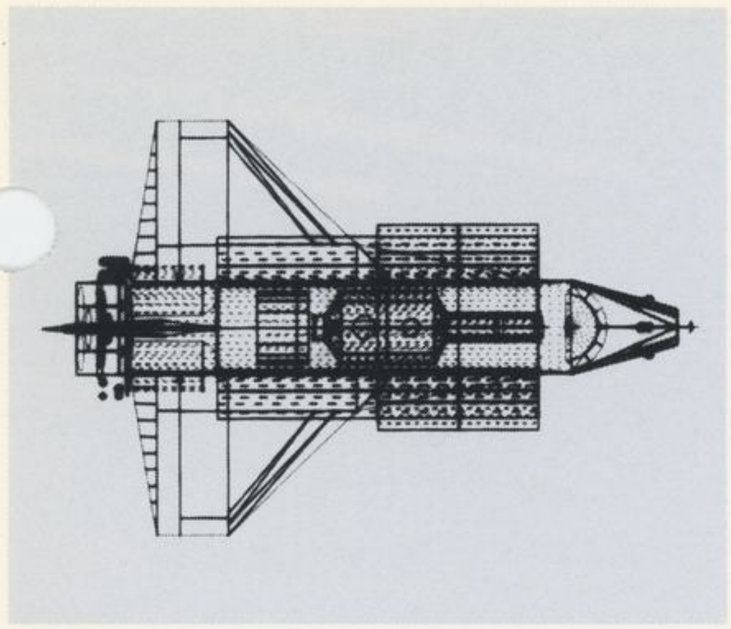
The first flag law did not specify exact colors, proportions, star arrangements or other details and since all flags in the Revolutionary period were made by hand each is different. No one today knows why the figure 76 was added to the canton.



Stars in the Bennington flag have seven points. Stars in other Revolutionary flags vary from four to eight points.

AFPRO has planned several special events for the year to offset cost of the flag, including a golf tournament, cake bake, and craft sale. Funds received in excess of the flag's cost will be donated to a local charitable organization.

Before being raised for the first time, the Bennington flag is displayed by Col. William A. Smith, far right, L. J. Adams, and, at left, division plant protection personnel, Cp. George A. Benway Jr. and Inspector F. E. Pe... Jr. Col. Smith, Air Force Plant Representative, presented the flag to Adams as the AFPRO bicentennial gift to the Denver division.



Computer-generated drawings are used by systems engineering to predict sources and areas of contamination for spacecraft. These drawings are Space Shuttle orbiter.

Division leads contamination assessment

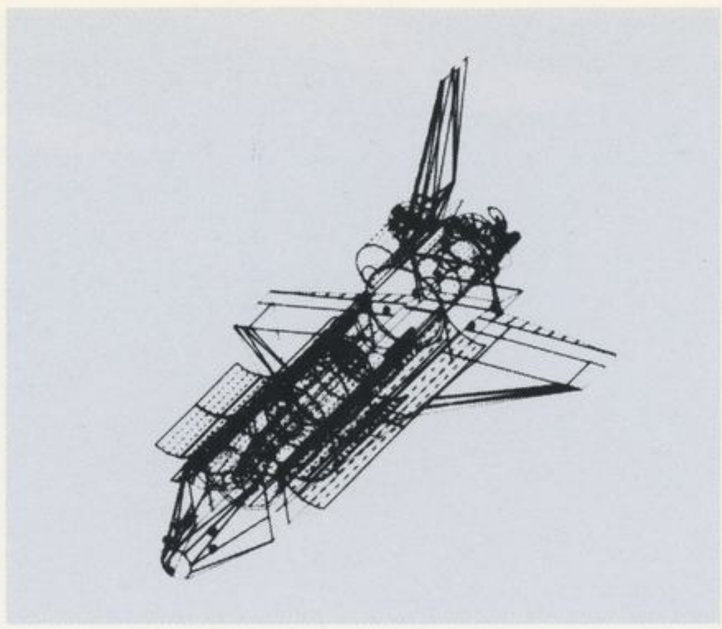
Contamination from a spacecraft can prevent instruments on board from operating properly or even prevent them from operating at all.

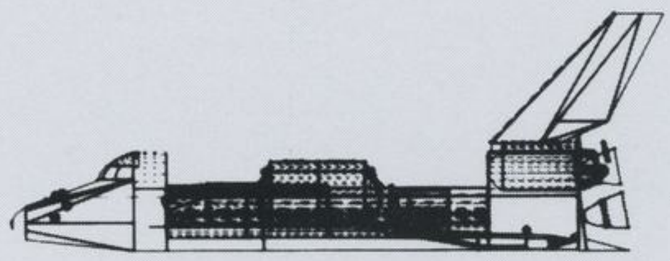
Contamination cannot be eliminated, but the division's systems engineering department has developed an assessment technology that can predict contamination and suggest ways to reduce it or work around it.

Work on the technology was begun early in the Skylab program by a team headed by Ernest B. Ress. During the four-year program, a series of computer programs was developed to predict contamination and the results it would have.

"Our job then," Ress said, "was to identify sources of contamination, determine how susceptible instruments and systems were to the contamination, develop measures to minimize and control contamination, and to develop spacecraft operation methods that would work around the contamination. And that continues to be our job."

The extended Skylab mission proved the division's capability to predict and contol spacecraft contamination on an orbit-by-orbit and on a day-to-day mission basis. That capability is being extended to new space programs, including the Space Transportation System with contracts supporting the contamination control development for both Shuttle orbiter and Spacelab carrier system.





"No other company has developed the technology to the degree we have," Ress claims. "Our analytical approach through our computer programs is unique. We can show a customer where contamination will come from, how the location of the source may be changed to allow it to be controlled, or how instruments may be protected.

"We know we cannot eliminate all contamination. It will always be there because of the induced environment in which a spacecraft operates. We can minimize its effect."

Covering optical surfaces when not in use, recognizing false instrument readings caused by contamination, and changing the attitude of the spacecraft during certain experiments are among ways contamination effects are minimized.

Working with Ress on the contamination assessment program from systems engineering are Lyle E. Bareiss, who works on systems and analysis; Vearl W. Hooper, a systems designer; Dr. Joseph A. Muscari, optics, instumentation, and methodology development; Dr. Raymond O. Rantanen, surface physics and methodology development; from aerothermal and propulsion engineering, Milton A. Hetrick, engines and plumes methodology; and from mission operations and software departments, Deborah A. Strange, computer and software engineer.

Bond campaign ends with 97% participation

The recently ended U.S. Savings Bond campaign was successful with 97 percent of Denver division employees at all locations participating in the payroll savings plan.

Vandenberg lead offsite employee participation with 100 percent, but the biggest gain in the campaign was made in Michoud where participation went from 74 percent in 1975 to 99.9 percent this year. Canaveral operations went from 96 percent in 1975 to 99 percent this year with participation among division employees at JPL remaining the same, 94 percent.

Four organizations at Denver reached 100 percent. They are requirements, the executive offices, launch vehicles, and professional and industrial relations.

At 99 percent were quality, materiel, contracts, and operations and services.

Other organization percentages of participation:

Engineering, 94; electronics, 94; manufacturing, 97; finance, 97; facilities, 88; CCMS, 95; program development, 98; and Viking, 95.

Division supplier earns SBA award

Ihly Industries, Inc., and Englewood tool and die company that supplies precision machined parts to the division, has been named regional subcontractor of the year by the Small Business Administration.

The firm was nominated for the award by the Denver division. Ihly earned the division's highly competitive supplier of the month award in February 1975.

As one of 10 regional winners, Ihly Industries will be in contention for the National Award.

The firm was founded by Eugene Ihly in 1972 with three employees and has doubled in size and volume each year since.

MARTIN MARIETTA NEWS
Published by Public Relations
MARTIN MARIETTA AEROSPACE
Call Ext. 5364 with suggestions or information for articles.
Denver Division
P.O. Box 179
Denver, Colorado 80201
May 1976

Three cited for technological disclosures

Three employees have been cited for technological disclosures in a recently established NASA New Technology Motivation Program at the division.

First to receive recognition in the program are:

J. C. Pohlen - "Load Limiter—Viking Landing Gear"

Jon R. Schulz - "Process for Removing Urea and Ammonium Ion from Recirculated Wastewater"

John C. Tietz - "Edge-Following Algoithm for Tracking Geologic Features from Earth Resources Satellites"

The division program is designed to support NASA's objective to make new technology developed or put into practice in the space program available for non-space use. It replaces ONTAP, the division's former new technology program.

All employees working in support of NASA programs are eligible for professional recognition in the program.

The New Technology Evaluation Committee, chaired by M. B. Chandler, appraises the new ideas and selects contributors for recognition. Members of the committee are John Wilson, John Lager, and Ward Rummel.

First U. S. space flight made 15 years ago

A 15-minute flight 15 years ago marked the entry of the United States into the age of manned space travel.

The 302-mile suborbital flight by Astronaut Alan B. Shepard Jr. May 5, 1961 was a major milestone in the nation's space program.

The flight—15 minutes and 22 seconds to be precise—of the Mercury spacecraft Freedom 7 was America's first manned space adventure.

Although unsophisticated when compared to the 30 manned missions which were to follow, the flight was a key mission for NASA.

Test, training underway for Viking team

Viking I and Viking II are travelling smoothly on their journey to Mars but back on Earth things are not going so smoothly for the Viking flight team—and that's the way it is supposed to be.

It is called anomaly test and training and the lander support office (LSO) at the division supports the Viking project test and training group in defining the anomalies (irregularities) the flight team will see in the tests as well as projecting the proper and correct response the team should make.

In recent and current tests, these are examples of problems set up for the flight team to solve:

- on an attempt to collect a soil sample, the flight team got a "no-go" on the electronics; team had to rework and replan the exercise
- computer side A goes out; team had to diagnose the problem and correct it
- descent load error; team had to find the error
- inertial reference unit temperature makes extreme drop; find the cause ar correct

How has the flight team done? Technically, great. Problems have been solved, replanning, work arounds, and corrections have been handled properly.

In addition to the testing, the LSO continues to support the flight team in other preparations for the approach to Mars and the landing on the planet.

Both the proof test capsule and the Viking controls mockup at GPL are being used regularly.

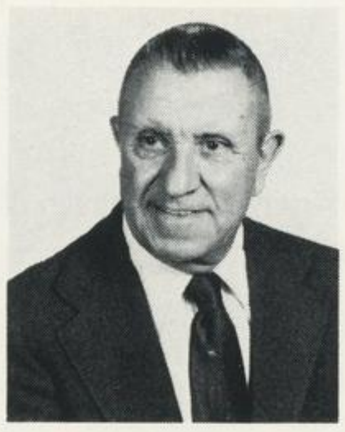
Flight software changes are being designed and verified; lander landing site selection is being verified; contingency tests are being made on all science systems; contingency tests are being made on selected lander subsystems; operational redundancy review is being made for subsystems; validation is being made on the descent mission; and post landing entry analysis of all flight data is being performed.

Inventor retires; to keep inventing

The Martin Marietta Corporation's Inventor of the Year for 1975 retired at the Denver division April 30.

But Morley V. Friedell is not ready to quit inventing. Nor will Martin Marietta miss out on his ideas.

Friedell will spend his retirement years in the Bitter Root Valley in Montana where he was born 65 years ago. His home, however, will be quite different than the one in which he lived as a child.



Friedell

He is building a completely solar powered retirement home, with energy for heating, cooling, and electricity all coming from the sun.

"I have been developing the techniques and experimenting for about three years," Friedell said. "I've detailed the whole project in an Idea Report I submitted to the division."

While the solar collectors on the roof and the water reservoir for energy storage are important aspects of the new home, you get the feeling the workshop is the most important part of the home to Friedell.

"I'm going to keep inventing, concentrating on solar energy and power conversions," Friedell says.

He already holds 23 patents and several more are pending. His inventions have been primarily in valves, mechanical devices, and fluid handling equipment. Most are in use.

His latest patent issued is for Space Shuttle prevalves, a control valve for the main propellant system. The prevalve is being built by Fairchild Stratos under license from Martin Marietta.

"They have built the first one and it works," Friedell said.

Richard W. Vandekoppel, for whom Friedell worked in aerothermal and propulsion engineering described Friedell as a "tremendously creative individual."

Vandekoppel added, "We will miss him

A fellow employee who overheard part of the interview with Friedell added his tribute: "The work load for the division's patent attorney is going to be a lot lighter now that Morley is leaving."

MARTIN MARIETTA
news
MICHOUD OPERATIONS

Liquid oxygen tank test headied at MSFC in Huntsville

The liquid oxygen (LO_2) tank modal survey test is the second major test to be performed at Marshall Space Flight Center (MSFC) in Huntsville in the series for the external tank and will follow the intertank structural test (see previous issue of Martin Marietta News).

The test will verify the external hydroelastic dynamic model used in the Shuttle system POGO (self-induced longitudinal oscillations) model.

The hydroelastic dynamic model, developed by Martin Marietta for Space Shuttle, predicts modal properties of thin-skinned monocoque LO_2 tank structures coupled dynamically with the liquid oxygen fluid. These models are significant in determining the propulsion system tendancy to respond to the POGO effect.

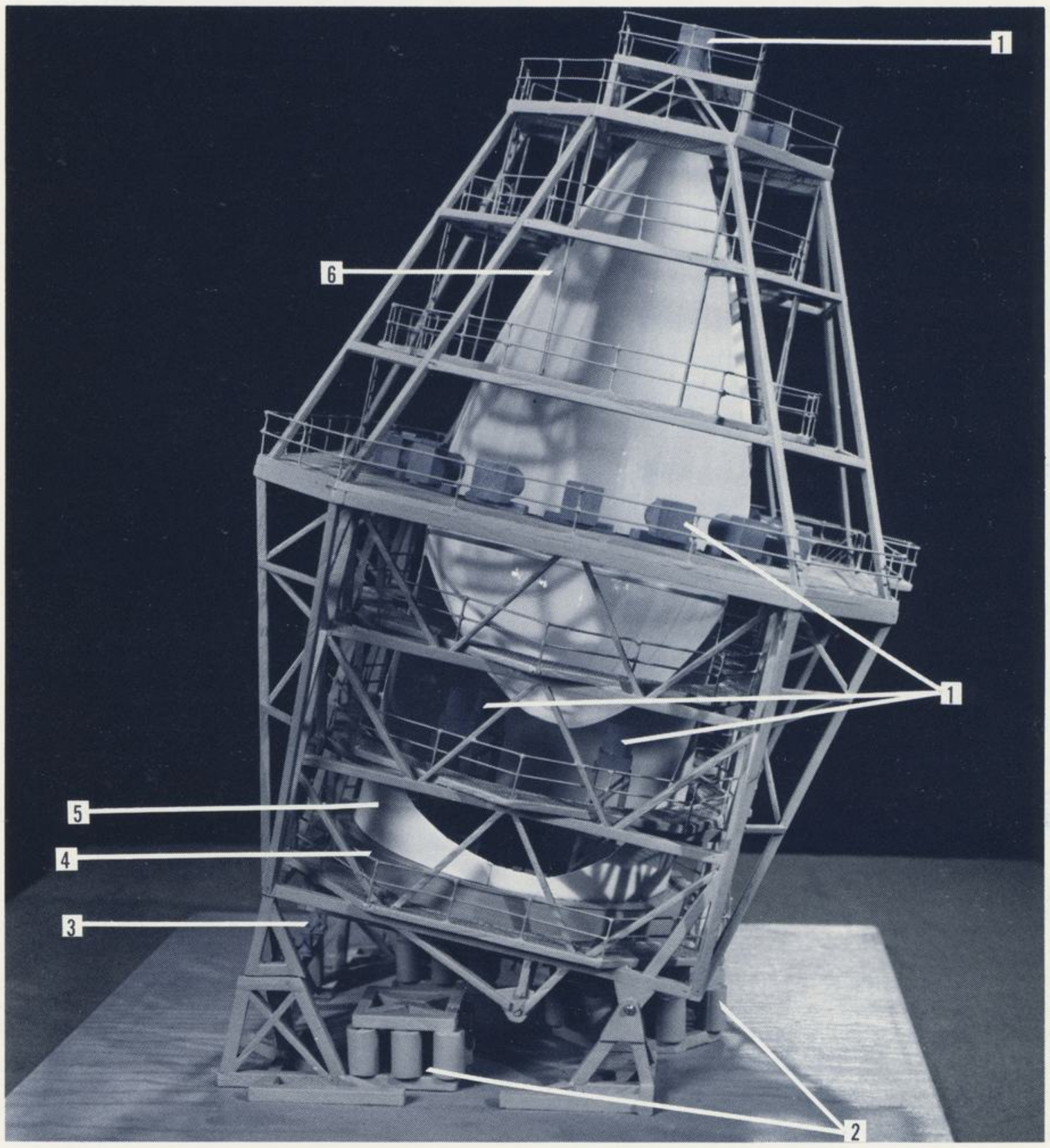
The LO_2 tank modal survey test article includes an intertank and an LO_2 tank. It is bolted at the bottom of the intertank to a ring fixture supported by low frequency pnuematic springs—air bags. Excitation is achieved by exciting the LO_2 tank with shakers with a dynamic range of 3 to 50 Hz and a force input capability of up to 600 pounds.

Eighteen shaker attachment locations are used with as many as six shakers operating simultaneously to excite certain modes. Demineralized water is used to simulate liquid oxygen in the LO_2 tank.

The tank will be tested in a vertical position full of liquid and at lower liquid levels in a 13 degree canted position to simulate various times in the flight. More than 200 data channels will be monitored to obtain hydroelastic modes.

"The highly unsymmetric Space Shuttle configuration poses unique analytical problems," Larry Hansen, chief of external tank dynamics and loads said. "To solve them, a finite element fluid structural model was developed by Carl Bodley at Denver and Louis Palerma at Michoud.

"This model will be verified from the LO_2 modal test data generated according to test requirements defined by Edward McHugh, chief of STA dynamics at Michoud."



1-dynamic exciters (shakers); 2-pneumatic suspension system (air bags); 3-mechanical screw jacks; 4-support ring; 5-intertank cutaway; 6-liquid oxygen (LO_2) tank.

External tanks in Bicentennial exhibit

Michoud Operations has put a three-dimensional model of the External Tank on exhibit for the New Orleans Bicentennial Commission's six month exhibition being held in the old U.S. Mint on Decatur Street and Esplanade Avenue.

The 140-year-old Mint, which opened recently for its first exhibition, is the oldest existing mint building in the country. During the Civil War it was the only mint of the Confederacy until New Orleans was captured by Union soldiers. Its last use was as a Coast Guard Station during World War II. It has been vacant since then.

The External Tank is located in one of the larger rooms of the Mint as a part of a NASA exhibit tracing America's efforts in space and outlining future programs.

The Bicentennial exhibit also contains pictures, art work, sculpture, models and numerous displays dealing with New Orleans and South Louisiana history.

The Mint will be open daily, from 10 a.m. to 5 p.m., through September 30 for public viewing.

In Michoud

Call C. H. Fleischer at 3876 with suggestions or information for articles for the Martin Marietta News

From Michoud

Model aids in planning

How do you begin to lay out an intricate production line in a building that is 43 acres under one roof? Not to mention the thousands of square feet of office and engineering work areas. That is what confronted T. W. Morris, director of production Operations for Martin Marietta at Michoud Assembly Facility.

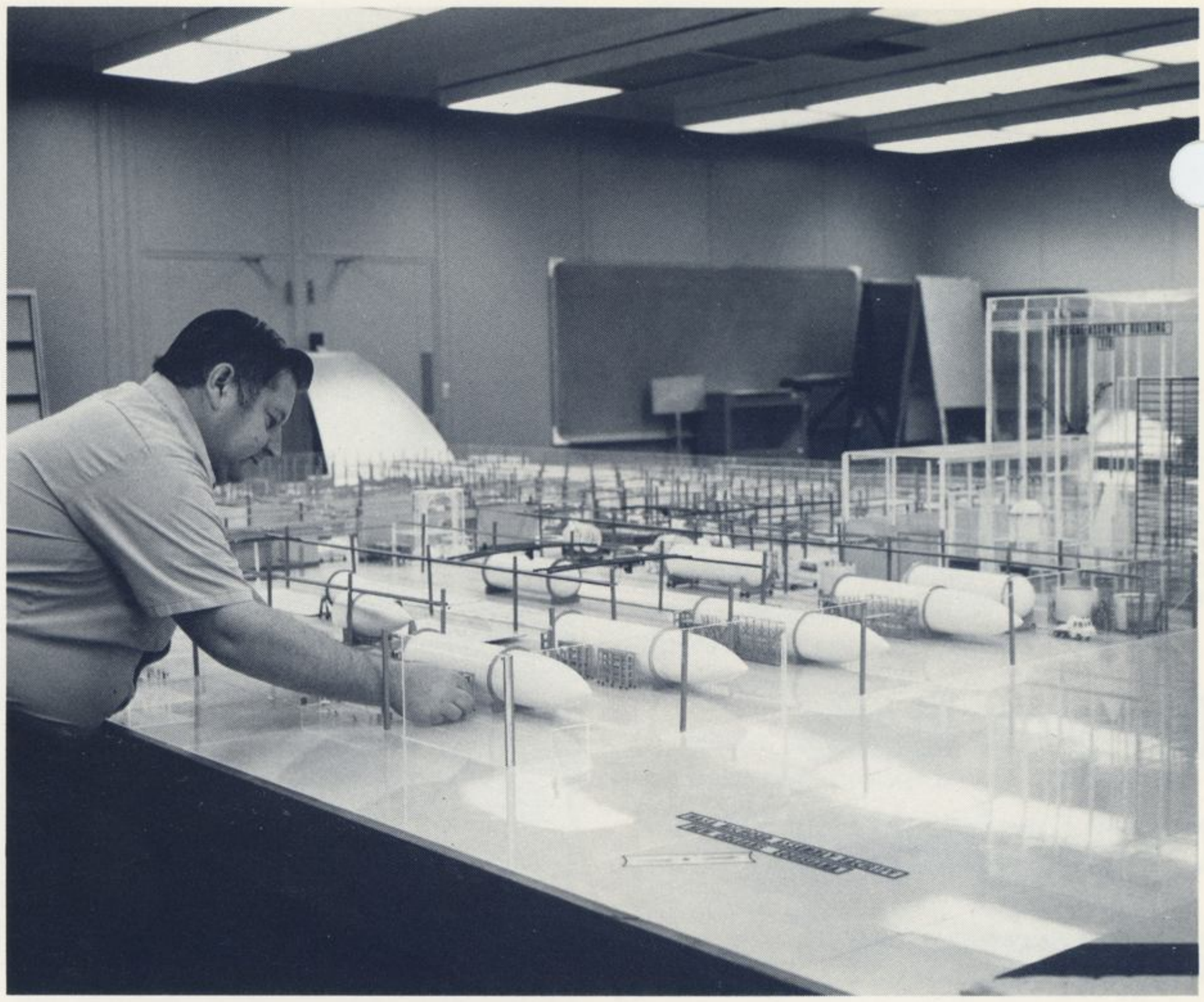
"Easy," says Morris in his usual breezy manner, "you build a 1/8 inch to one foot full scale work model of the area you have to convert."

One man is all it takes to save countless hours of planning, scheduling and physical measuring.

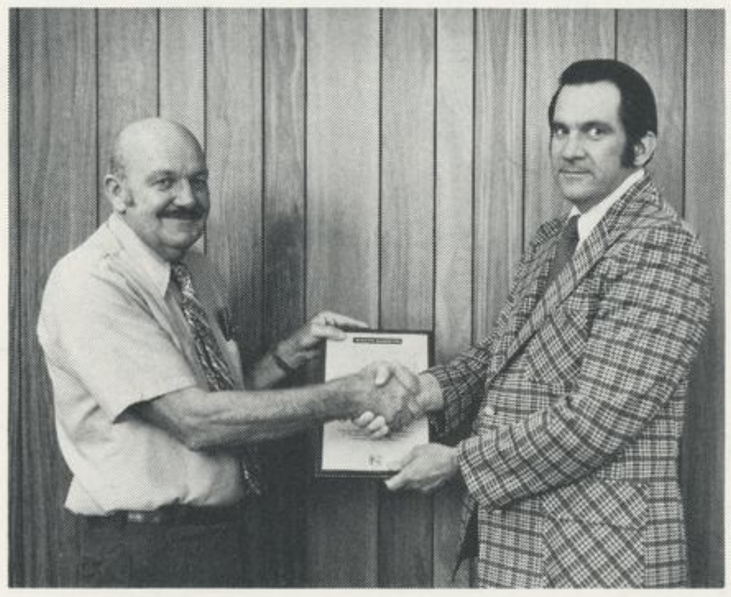
That man is Jules Damare, who occupies an unsung but most important position as MAF resident model builder.

Damare, a machinist by trade, uses the skills of a machinist with the knowledge he has gained from his life long hobby of building model airplanes from scratch and racing them in meets all over the country.

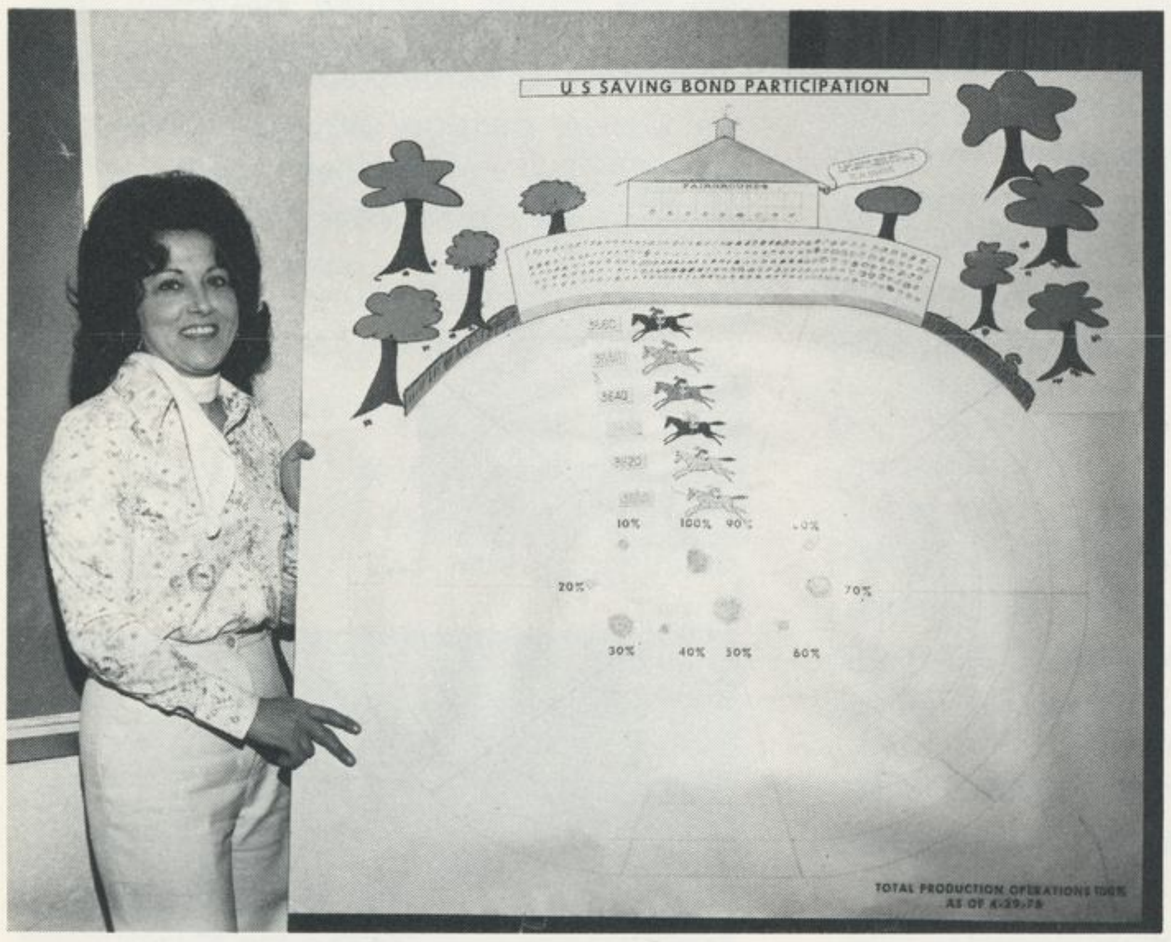
Damare and his wife, Janet have eight little "J's" - Jill, JoAnn, Joseph, James, Jack, Julie, Jennifer and Jan. "We named our first child Jill without really considering the J," said Damare, "but then it seemed like a good idea, so the J's kept coming."

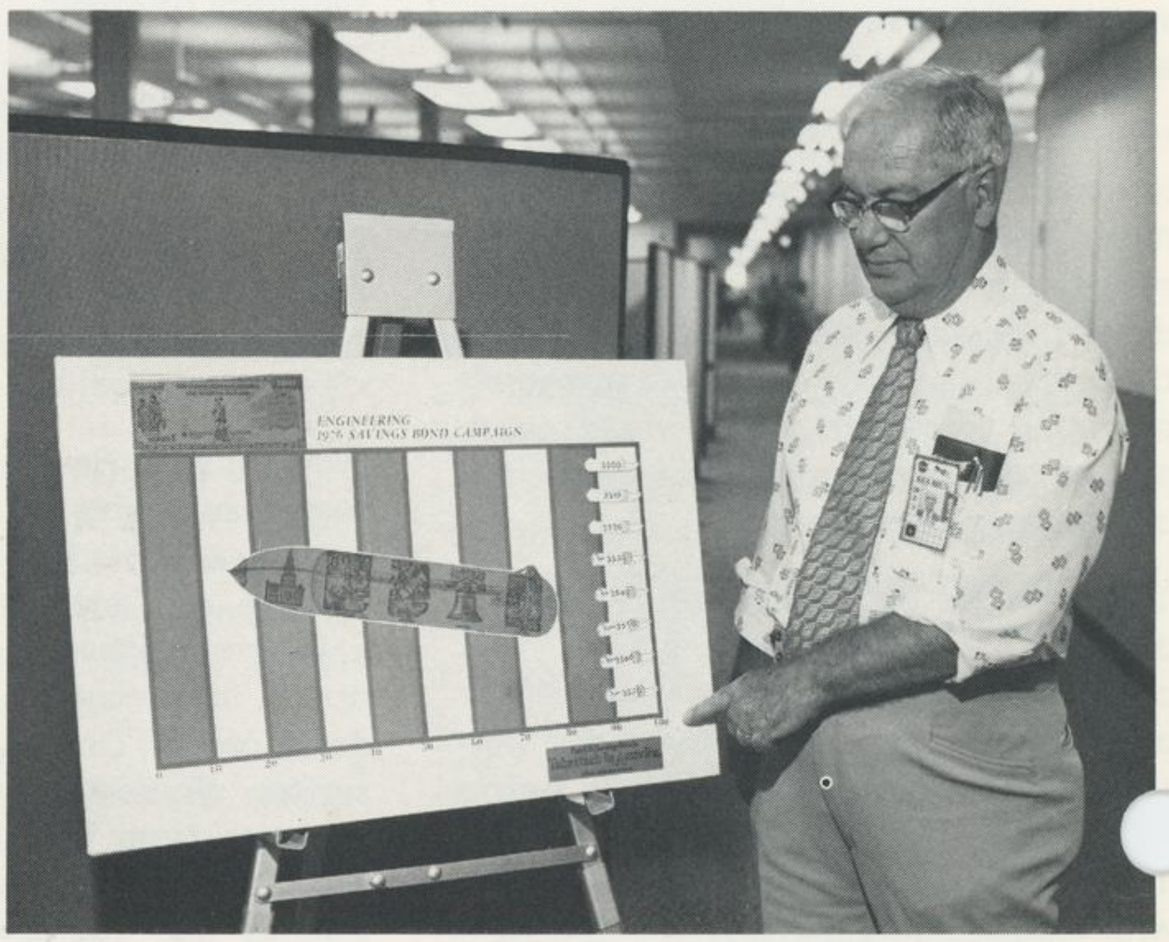


Jules Damare uses model to plan external tank production line



Harry Carroll, external tank systems analysis, is presented a Manned Flight Awareness performance award by A. M. Norton, director of engineering at Michoud, for a design change in the nose of the external tank that reduced heating levels and the amount and weight of sprayed on foam insulation required. The result is a cost avoidance of $40.8 million and net weight savings of 75 pounds per tank.





Fifteen organizations at Michoud recorded 100 percent participation in the recently ended U. S. Savings Bond campaign. At left, Janet Alvarez, production operations, displays the steeplechase board that recorded 100 percent participation by seven organizations in production operations. At right, Michael A. O'Hern points out 100 percent organizations in engineering. Michoud total participation is 99.9 percent.