






NUMBER 25/1982

Division Expenses 1982

JANUARY						1	2	
	3	4	5	6	7	8	9	
	10	11	12	13	14	15	16	
	17	18	19	20	21	22	23	
	24	25	26	27	28	29	30	
	31	1	2	3	4	5	6	
FEBRUARY	7	8	9	10	11	12	13	
	14	15	16	17	18	19	20	
	21	22	23	24	25	26	27	
	28	1	2	3	4	5	6	
MARCH	7	8	9	10	11	12	13	
	14	15	16	17	18	19	20	
	21	22	23	24	25	26	27	
	28	29	30	31	1	2	3	
APRIL	4	5	6	7	8	9	10	
	11	12	13	14	15	16	17	
	18	19	20	21	22	23	24	
	25	26	27	28	29	30	1	
MAY	2	3	4	5	6	7	8	
	9	10	11	12	13	14	15	
	16	17	18	19	20	21	22	
	23	24	25	26	27	28	29	
	30	31	1	2	3	4	5	
JUNE	6	7	8	9	10	11	12	
	13	14	15	16	17	18	19	
	20	21	22	23	24	25	26	
	27	28	29	30				

						1	2	3	JULY
	4	5	6	7	8	9	10		
	11	12	13	14	15	16	17		
	18	19	20	21	22	23	24		
	25	26	27	28	29	30	31		
	1	2	3	4	5	6	7		AUGUST
	8	9	10	11	12	13	14		
	15	16	17	18	19	20	21		
	22	23	24	25	26	27	28		
	29	30	31	1	2	3	4		
	5	6	7	8	9	10	11		SEPTEMBER
	12	13	14	15	16	17	18		
	19	20	21	22	23	24	25		
	26	27	28	29	30	1	2		
	3	4	5	6	7	8	9		OCTOBER
	10	11	12	13	14	15	16		
	17	18	19	20	21	22	23		
	24	25	26	27	28	29	30		
	31	1	2	3	4	5	6		
	7	8	9	10	11	12	13		NOVEMBER
	14	15	16	17	18	19	20		
	21	22	23	24	25	26	27		
	28	29	30	1	2	3	4		
	5	6	7	8	9	10	11		DECEMBER
	12	13	14	15	16	17	18		
	19	20	21	22	23	24	25		
	26	27	28	29	30	31			

261 WORKING DAYS

-  SALARIES AND WAGES (95 DAYS)
-  GOODS, UTILITIES, TRANSPORTATION AND SERVICES (129 DAYS)
-  LOCAL, STATE, FEDERAL TAXES (14 DAYS)
-  PENSIONS, INSURANCE, AND DEBT SERVICE (14 DAYS)
-  EARNINGS (PROFIT) (9 DAYS)

Augustine: business expands; employment stable

"We have enjoyed a very good 1982," said Norman R. Augustine, Denver Aerospace president, "and we anticipate 1983 will be as good or better."

"Your professional excellence and dedication," he said to employees, "are responsible for that success and the bright outlook for next year."

The company ended 1982 with new and follow on orders alone totaling more than \$1.5 billion.

"Employment increased slightly in 1982 as our business base grew," Augustine said.

"Best of all," he added, "the new hardware we delivered during the year functioned perfectly. Our primary goal is to repeat that record in 1983."

"To keep pace and grow in 1983, we will have to average over \$30 million in new and follow on orders each week," the president said. "The goal is possible, considering the interesting, technically challenging, competitive opportunities that will be decided next year."

He included in those opportunities SPADOC; the launch processing of Space Shuttle for NASA and the Air Force; the sale of Titan launch vehicles for private industry use; the aft cargo carrier for the external tank; the modernization of the air traffic control system; and many others.

"We won major contracts in 1982 and we will do it again in 1983," Augustine asserted.

"Winning new business is one way we are recognized for superb performance," he said, "but this year we were honored in quite a different way. We were named co-winner of the coveted Collier Trophy."

"That trophy is awarded by the National Aeronautics Association each year for the greatest achievement in aeronautics or astronautics," he said. "We shared the award with NASA, the astronauts, and the entire government/industry team for proving the concept of manned, reusable spacecraft through Space Shuttle."

"While winning a prestigious honor like the

Collier Trophy is never one of our specific goals," Augustine said, "we should perform on each contract as if it were. Our customers deserve our very best. I don't believe any of us would be happy with less than perfect mission success."

"Mission success is something for which each employee strives," he said. "It is the mainstay of our reputation in the aerospace field. Our success rate would be unobtainable, though, without the diligent work of that large team of people from Vandenberg to Denver to New Orleans to Florida. It is the entire team that has made it work."

"With the Peacekeeper missile scheduled for first flight test, several Space Shuttle and Titan launches planned, and other important product tests and deliveries to be made in 1983, we will have the opportunity to prove we are indeed the very best in our field."

"As I approach my first full year here, I am sincerely convinced of what I believed to be true before I came — you are the best," Augustine concluded.

Facilities and equipment improvement continues here

More than \$35 million was spent on facilities and equipment improvement in 1982 and more than \$38 million has been set aside for similar work in 1983.

"The acquisition and modification of the Littleton Systems Center and the completion of the new cafeteria in the engineering building were significant facility improvements,"

said R.H. Snodgrass, director of facilities and services.

About 500 employees moved to the new Littleton Systems Center facilities in 1982. Others will move there in 1983 as remodeling continues.

The remodeled cafeteria on the second floor of the engineering building has opened for business, with smoother flowing lunch lines, new menu items, and a fresh interior. The first floor cafeteria was redecorated.

New machines capable of closer tolerance work and new temperature control equipment were installed in the factory.

The new machines, most of them computer controlled, are designed for the close tolerances of highly sophisticated spacecraft hardware and mechanisms being pursued as new business by the company.

The temperature control equipment is designed to keep factory temperature within two degrees of 72—temperature needed to assure thermal stability of machines and materials.

A three-story addition connecting the engineering and administration buildings will be completed in 1983, providing 45,000-square feet of office space.

Also scheduled to be completed in 1983 is the north high bay airlock at the SSB.

"One of our goals in 1983," Snodgrass said, "is to continue our service to employees, to improve that service where possible, and not increase our service budget."



A three-story addition connecting the engineering and administration buildings is nearing completion.

Peacekeeper activities to lead to first test flight

"During 1982, we set the stage for the early 1983 first test launch of a Peacekeeper missile," reported H.F. Keyser, vice president and general manager of the Strategic Systems division.

"That's why it was a very busy year for us," he added. "And why 1983 will be just as busy."

(Peacekeeper is the name given MX by President Reagan to describe the role he sees for the missile.)

Key among the stage-setting activities was the completion of installation and checkout of test equipment in all the flight test facilities at Vandenberg Air Force Base.

The facilities include the integrated test facility, which is headquarters for all test operations; the payload assembly building; stage VI installation and checkout facility; stage processing facilities; mechanical maintenance facility; missile assembly building; and the test pad.

"Vandenberg, as you might guess, was a beehive of activity this year," Keyser said. "We also delivered all the support equipment and airborne vehicle equipment to support the first test flight."

Processing of the pathfinder missile has been completed for stages I, II, and III and the post-boost vehicle. The pathfinder missile assembly is complete through stage III.

Milestone tests were also completed this year.

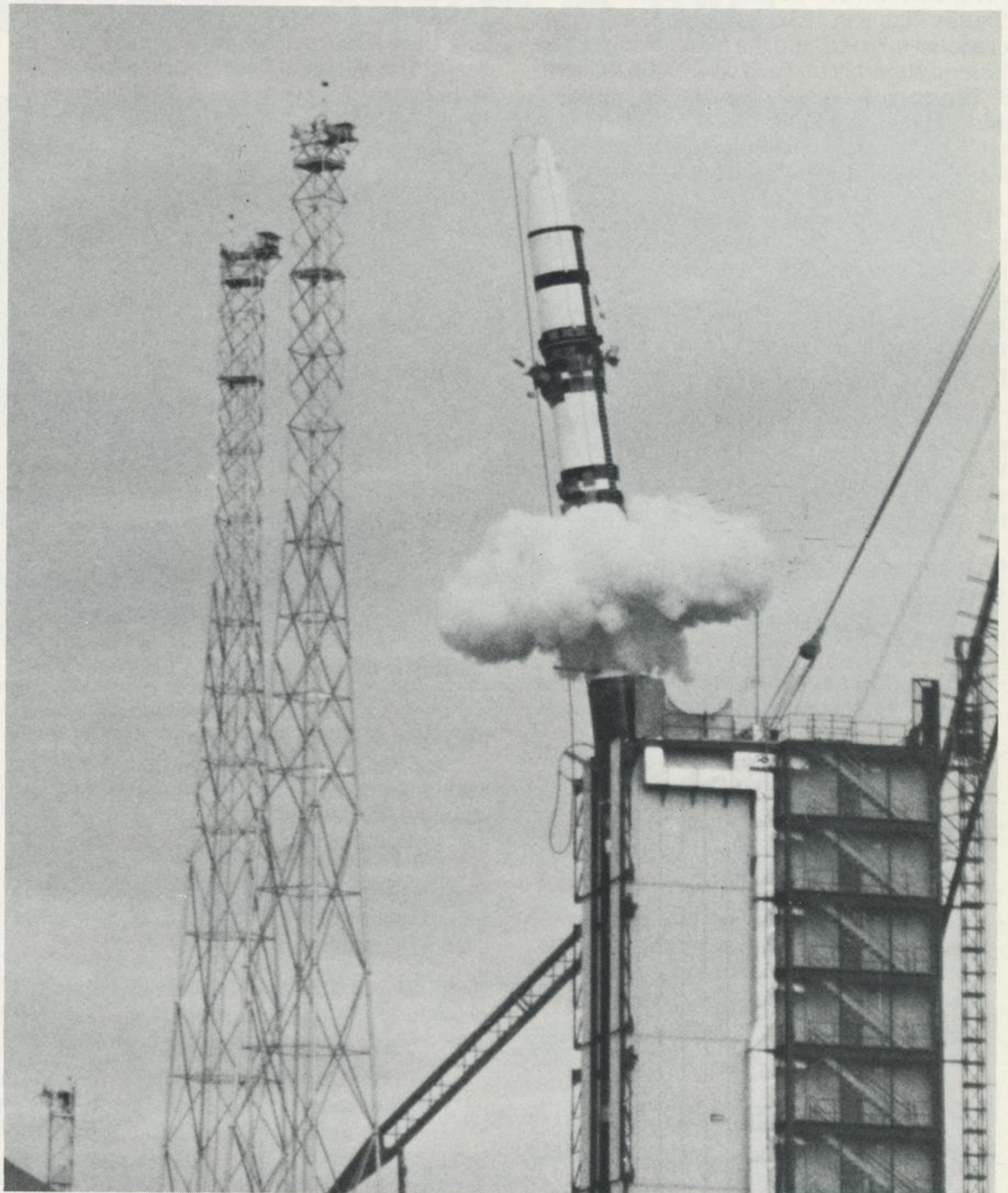
Two modal survey tests were successful here, confirming missile flight structural design analyses. In the Nevada desert, four canister assembly launch test program (CALTP) tests demonstrated the cold launch concept by simulating ejection of the missile from the launch canister.

The instrumentation and flight safety system was also completed and tested during 1982. This equipment will monitor the performance of flight test missiles.

"While we were delivering equipment and conducting successful tests," said Keyser, "we also achieved more than \$85 million in new and follow on business during 1982. We have a 1983 backlog of more than \$234 million."

Emphasis in 1983 will be on the flight test program, with three or four missile launches, and on support of activities leading to initial operation of the weapon system in 1986.

The first test is planned as a 4000-mile-flight to the Kwajalein Missile Range, and will involve all four stages, including targeted unarmed re-entry vehicles.



A test of the canister launch system breaks the California desert stillness as part of the company's involvement in development of Peacekeeper.

Public Relations expands public understanding of products and customers

"On balance, I believe the public relations department has done a better job this year in keeping people informed about our business," said John H. Boyd Jr., who heads that department.

"We have several 'publics' or interest groups with which we communicate regularly," he said. "Employees, our customers, decision makers in government, and the general public are the main audiences for the work we do."

Boyd also said that his department aids customers in their communication.

"This year we were involved in 32 technical displays and exhibits and more than half a dozen slide shows and films," he said. "All were in support of communication with and for our customers."

A mural developed for one of the exhibits is

about to find another use. The painting depicts the air traffic control system in the U.S. It is of such high quality technically and artistically that the FAA wants it mounted to hang in the lobby of the organization's headquarters in Washington.

"The mural is a good example of the recognition the company and employees get for work well done," Boyd said.

"We will have opportunities in 1983 for the same kind of recognition," he said. "The first launch of MX—now called Peacekeeper—and the exciting opportunity to commercialize our Titan launch vehicle can provide significant recognition of our capabilities."

Next year, more improvements are planned in employee communication as well as in the normal, day-to-day communication with customers and the general public.

Space Launch Systems records mission success

The first launch of the new Titan 34D October 30 was the crowning achievement of a year that saw two other successful Titan launches—including the last IIC on March 6—for another year of perfect Titan launches.

"The continued mission success of Titan is a tribute to all those who have worked on the vehicle from its very beginning," said Peter B. Teets, Space Launch Systems division vice president and general manager. "We expect that same success in 1983."

Titan's success ratio since its beginning is nearly 98 percent. And the trend is right—the record is perfect over the past six years.

"That success is opening up an exciting new opportunity for 1983—the commercialization of Titan," Teets said. "We are going to make something happen."

Recently, the company signed a letter of intent to provide the SpaceTran Company with

Titan launch vehicles for the commercial market. SpaceTran has proposed to build a fifth Shuttle orbiter for NASA in exchange for use and marketing rights. Having Titan available as a common, expendable backup would help SpaceTran make firm launch date commitments.

Titan 34D was planned by the Air Force for use during the transition phase to Space Shuttle, and as a backup system to launch high-priority defense payloads.

The 34D's added thrust and longer burn time allow it to place heavier spacecraft into near-Earth orbits. It will also accommodate a number of different upper stages, such as the IUS and Transtage, to boost spacecraft into geosynchronous orbits.

"We have also made excellent progress on this division's work for the Space Transportation System," said Teets.

At Vandenberg Air Force Base, the division was busy preparing for the first Air Force Space Shuttle launch from that site in late 1985. At the end of 1982, construction was approximately 70 percent complete.

The division is managing the development of all of the Air Force's Space Shuttle facilities at Vandenberg, including designing complex mechanical and electrical ground support systems; developing the software, and acquiring support equipment.

Parallel with this work is work being done at Houston, El Segundo, and Sunnyvale on payload integration for the Department of Defense Space Transportation System.

"That work is also progressing well," said Teets.

More than half the division's 4300 employees are working outside Denver—nearly 2000 of them at Vandenberg Air Force Base.

Of those at Vandenberg, about 1500 are on the ground support system project for Shuttle.

"Next year will be a very significant year for these people and that project," said Teets. "That first launch of Shuttle is getting closer."

This year was a good year for Space Launch Systems with orders at more than the \$311 million mark. The division will be working on an estimated \$242 million backlog in 1983.

"In addition to the effort to commercialize Titan and to continue its mission success record, we have one other key goal," Teets said. "We are going to do a careful market analysis to determine business opportunities where we can use the talents of the excellent people we have."

Special events planned for families

Two special events have been planned for employees and their immediate families in 1983.

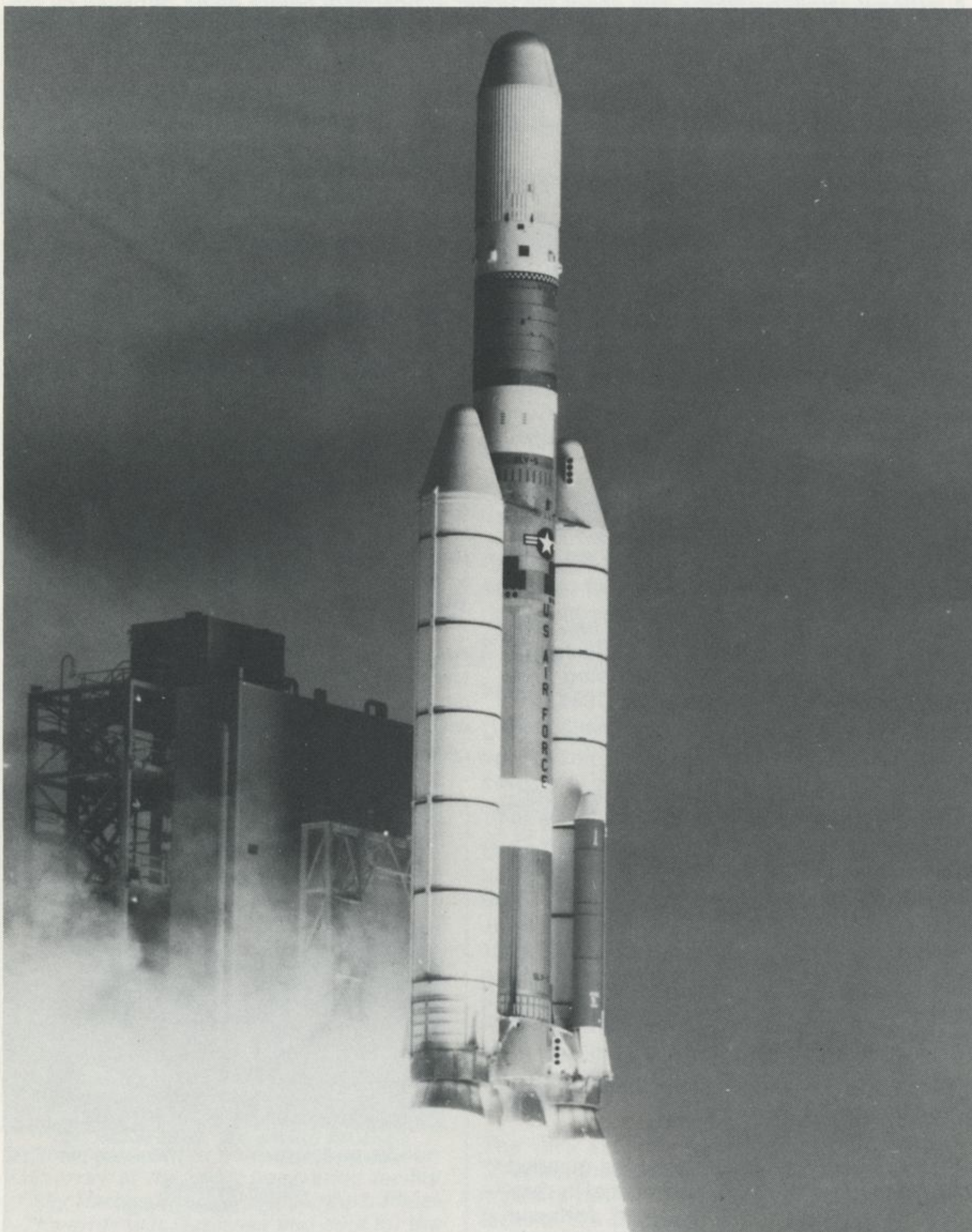
In February and March, Denver Aerospace and Data Systems employees will be able to choose one of four Denver Nuggets games.

In June, the choice will be one of two El Jebel Shrine Circus performances.

Reservation cards have been mailed to employees and are to be returned by January 10.

The Nuggets will oppose Seattle, February 24; Washington, February 26; Milwaukee, March 5; and San Antonio, March 8.

The exclusive circus performances for employees will be June 11 at 10 a.m. and at 2 p.m. in the Denver Coliseum.



Launch of the first Titan 34D provided the Air Force with prime and back-up launch capability during the transition from expendable launch vehicles to the reusable Space Shuttle system.

Space and Electronics Systems division has successful year, anticipates growth in 1983

The Space and Electronics Systems division is the most diversified organization in Denver Aerospace, according to Robert J. Polutchko, the division's vice president and general manager.

"Partly because of this diversification," he said, "we also have the most opportunity for growth."

"This year was very successful," Polutchko said. "We expect 1983 to be a good year for new business."

In 1982, the division had new and follow on orders valued at \$395 million; its 1983 orders backlog is more than \$699 million.

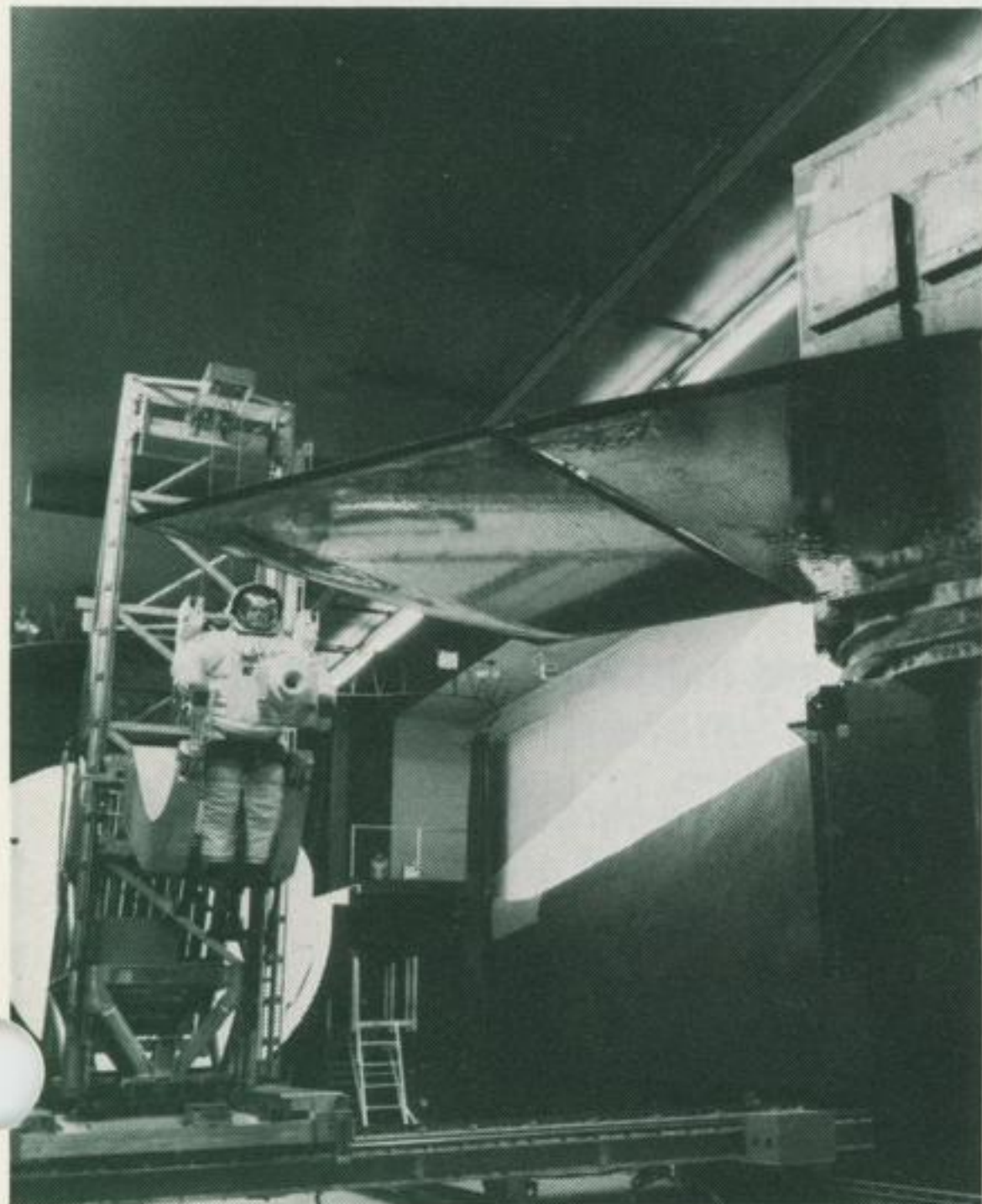
"In November, we won a contract for a very ambitious and technically interesting program — the tethered satellite system," Polutchko reported. "The system will provide a unique way to explore the upper atmosphere by trolling a 'smart' spacecraft from a line attached to Space Shuttle."

Tethered satellites can be deployed as much as 60 miles from Shuttle, and can provide an economical means of exploring the upper atmosphere where stable orbits are not possible.

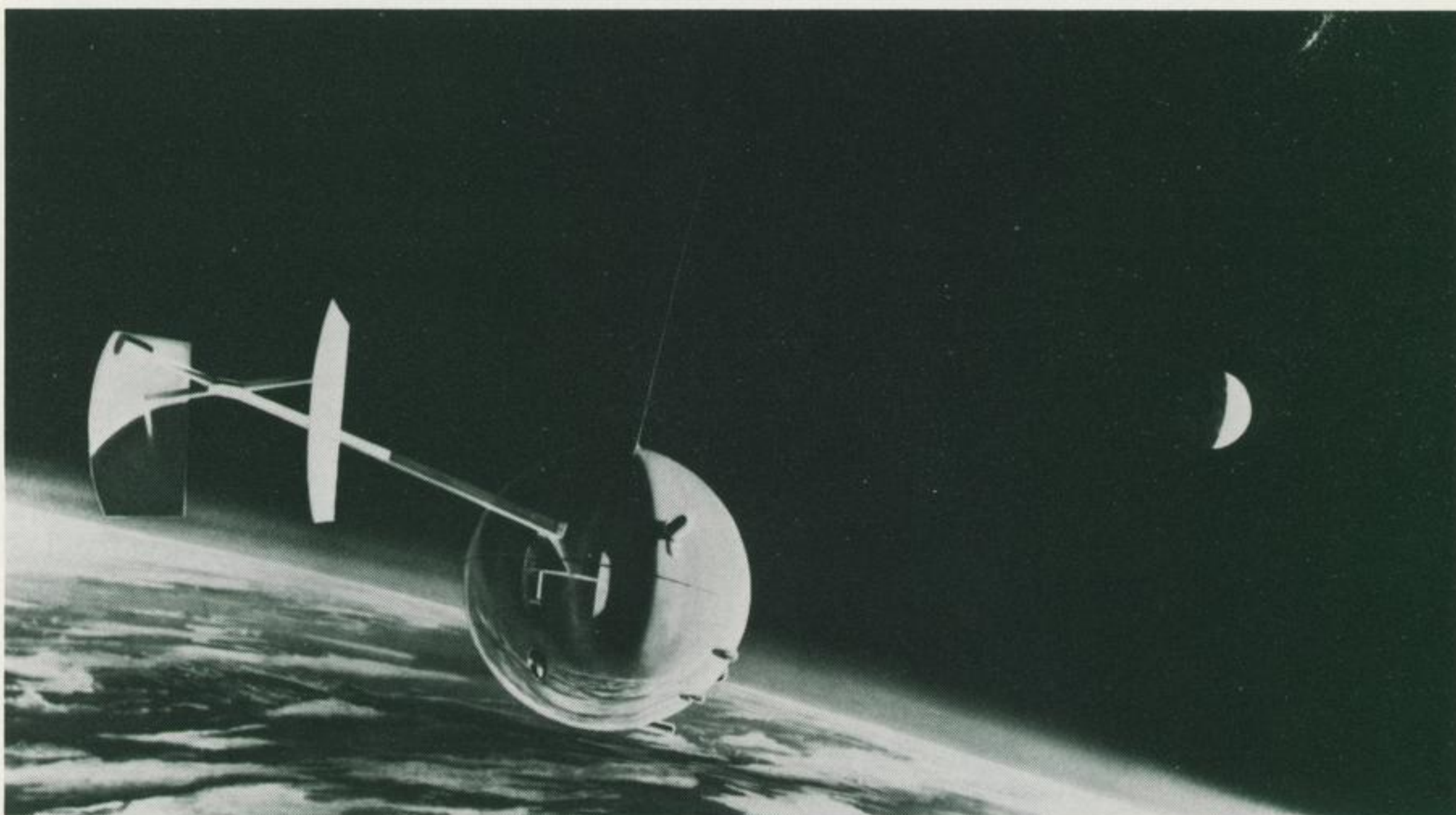
The first tethered satellite will be built by the Italian space agency through an agreement with NASA. The initial flight of the tethered satellite system is expected in the late 1980s.

In a new business thrust in 1983, the division will focus some of its attention on a different kind of space — that used by commercial and private aircraft.

"We want to be the prime integrating contractor in the Federal Aviation Administration's comprehensive plan to modernize



Astronaut Bruce McCandless "flies" in the space operations simulator to link up with a spinning full-scale mockup of the solar maximum mission satellite.



A tethered satellite gathers data about the upper atmosphere before being retrieved by the Space Shuttle in this artist's concept. Denver Aerospace will develop the satellite system and hardware for NASA. The government of Italy will design and build the satellite itself.

and automate the air traffic control system," Polutchko said. "The FAA is looking at a 20-year program."

A request for proposal is expected in February 1983 for the advanced computer system phase of the modernization. Later, there will be a competition to build microprocessor-based displays for controllers, and to provide new air traffic control software.

In the air traffic control effort, the company has teamed with AIL Division of Eaton Corporation, Planning Research Corporation, and Stanford Telecommunications.

Back in outer space, the division is one of the major competitors doing a preliminary space station study that could lead to a manned platform in space.

Another study, begun in early 1982 and continuing in 1983, could lead to the building of a spacecraft for a Venus radar mapping mission. If authorized for a start in 1984, the spacecraft would be built here and launched from Space Shuttle in 1988.

The division's products made a major contribution to the success of Space Shuttle in 1982 and were involved in moving it to its operational stage. It builds all the flight and ground systems the company provides for Space Shuttle — except for the external tank.

Included are the reaction control system tanks; the pyrotechnic initiators; the caution and warning system; the solid rocket booster recovery system.

"These Space Shuttle systems have worked to perfection," Polutchko said.

Another Shuttle-related system, the manned maneuvering unit, completed most of its testing in readiness for delivery to Johnson Space Center early in 1983. It is scheduled to be tested on Shuttle flight 11.

Work also proceeded on techniques and tools for the first repair of a satellite in orbit. An astronaut, using the MMU, will stabilize the Solar Maximum satellite, spinning because of a failure in an altitude control system module. The disabled satellite will be returned to the orbiter's cargo bay for repairs.

The faint object spectrograph for space telescope was assembled and tested this year. One of the five main instruments in the space telescope, FOS will be able to observe objects 100 times fainter than Earth-based telescopes.

Back on Earth, two of the six automated staff message processing centrals being built for the U.S. Army Communications and Electronics Command were delivered two months early for use in Europe. The other four truck-mounted units will be delivered in 1983.

And in 1983 an award is expected for a contract for selection of electronic data processing equipment and software development for the Space Defense Operations center to be built near Colorado Springs.

MARTIN MARIETTA NEWS Published by Public Relations MARTIN MARIETTA AEROSPACE

Call Ext. 5364 with information or suggestions for articles, or call one of the following coordinators.

Technical Operations:	Kenneth E. Sedlmayr 6872
Solar Energy Systems:	Leon E. Taylor 0660
Business Development:	Leonard G. Taigman 4466
Space/Electronics Systems Division:	J. H. Guilfoyle 6944
Strategic Systems Division:	John H. Pond 9165
Space Launch Systems Division:	Steven L. Cohen 2037
Business Management:	Daphne R. Gillison 3155
Michoud Division:	Evan D. McCollum 3788
Canaveral Operations:	Donald T. Beck 9108
External Tank Operations (KSC):	Melodie deGuibert 3160
Vandenberg Operations:	William Leary 2202

DENVER AEROSPACE
P.O. Box 179—Denver, CO 80201

December 23, 1982

Michoud division achieves mission success on Shuttle launches

"We saw three more successful Space Shuttle flights in 1982, including the first operational mission, and the external tanks performed superbly on each one," said Kenneth P. Timmons, Michoud division vice president and general manager. "That record of mission success is attributable to the outstanding employees of the Michoud division.

"The delivery to NASA of the first lightweight tank was another important milestone for us in 1982," he said, "and I was very pleased to give NASA a 4000-pound bonus — we were asked to reduce the tank's weight by 6000 pounds and we eliminated an additional 4000 pounds."

"Increasing our external tank production rate to 24 per year is a crucial long-term objective. We made some important strides in 1982 and we expect to make further advances in 1983," he said.

Changes in the factory have been made or are under way to make this rate possible.

Included are:

- Additional production cells for applying the thermal protection system;
- Installation of automated trimming and welding tools;
- Creation of a wide east-west aisle through the 43-acre factory to streamline the movement of tank components;
- Development of an innovative method for the application of thermal protection material around critical components that replaces a laborious hand process.

"We delivered four tanks to NASA in 1982

and we expect to deliver seven during 1983. As Shuttle launches become more frequent, tank deliveries will become equally as frequent. The Michoud division will produce an external tank for every Space Shuttle flight — we expect to be manufacturing external tanks here for many years."

The division is under contract to build tank elements through flight 36.

The Michoud division has joined forces with four other aerospace contractors to bid NASA's Shuttle processing contract which will cover work at both Kennedy Space Center and Vandenberg Air Force Base.

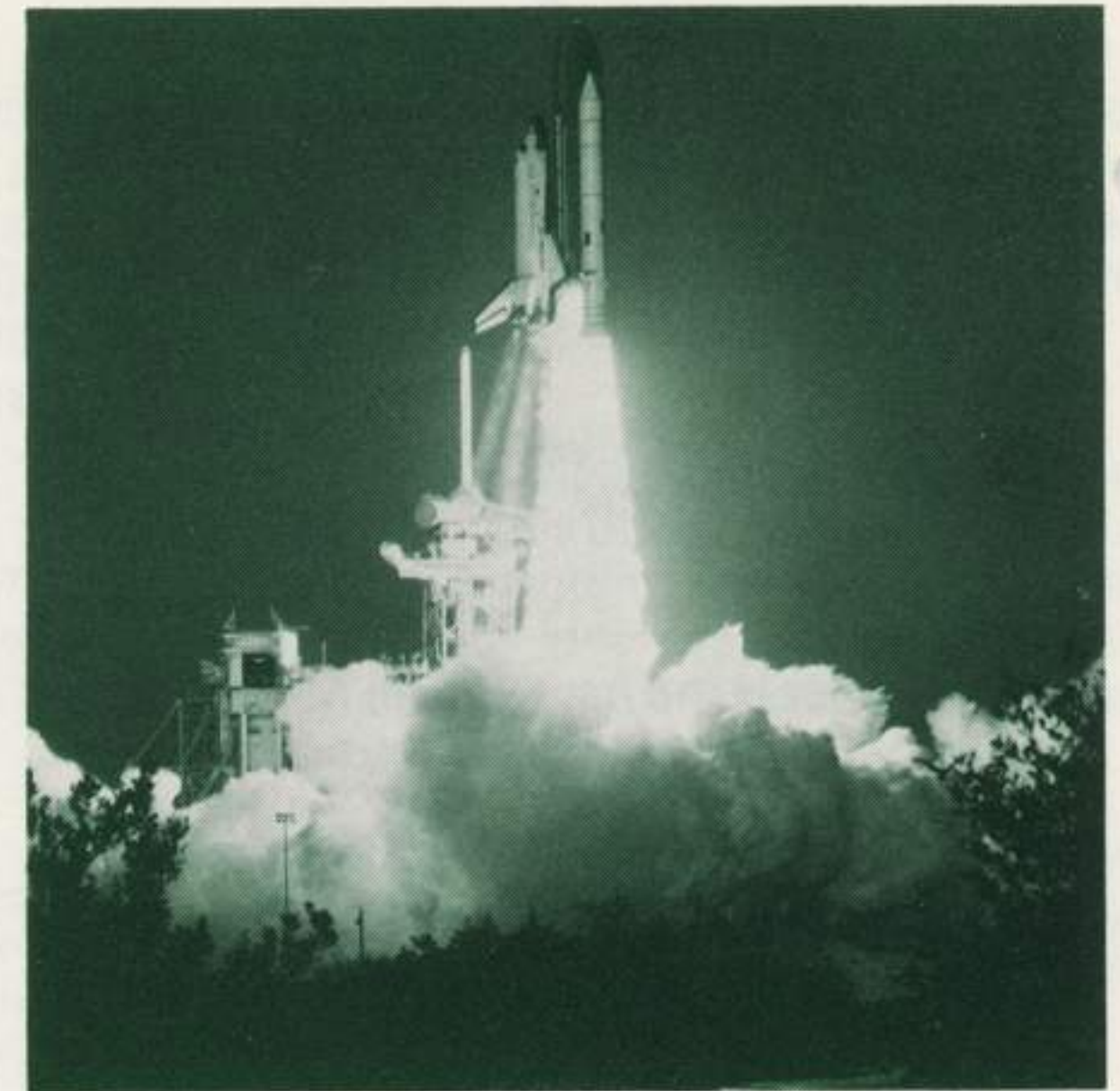
The team, led by Rockwell International, includes Martin Marietta Aerospace, United Space Boosters, Inc., The Boeing Company, and United Air Lines. Under the team's agreement, Martin Marietta's responsibilities will increase at KSC and Vandenberg.

"This team has the experience, knowledge, and efficiency which we believe essential to succeed at this kind of job," says James McCown, who is leading the proposal effort for the Michoud division.

Michoud division employment passed 4000 in 1982. About 300 of these employees are at Kennedy Space Center where part of the division's activities includes external tank testing and processing.

The division's orders in 1982 were more than \$687 million with the 1983 backlog at more than \$741 million.

Beginning in January 1983, the division will provide all its own housekeeping. The contract awarded by the division's customer, the



The first operational Space Shuttle lifts off from Kennedy Space Center.

Marshall Space Flight Center, is a move to provide for more efficient operation of the facility.

Michoud has anticipated a Space Transportation System need for greater cargo volume. The result is a design for an aft cargo carrier for external tank which could double the payload capacity.

In October, NASA and the Michoud division sponsored a community-wide open house. An estimated 100,000 attended, giving a good indication of high-level interest in the space program.

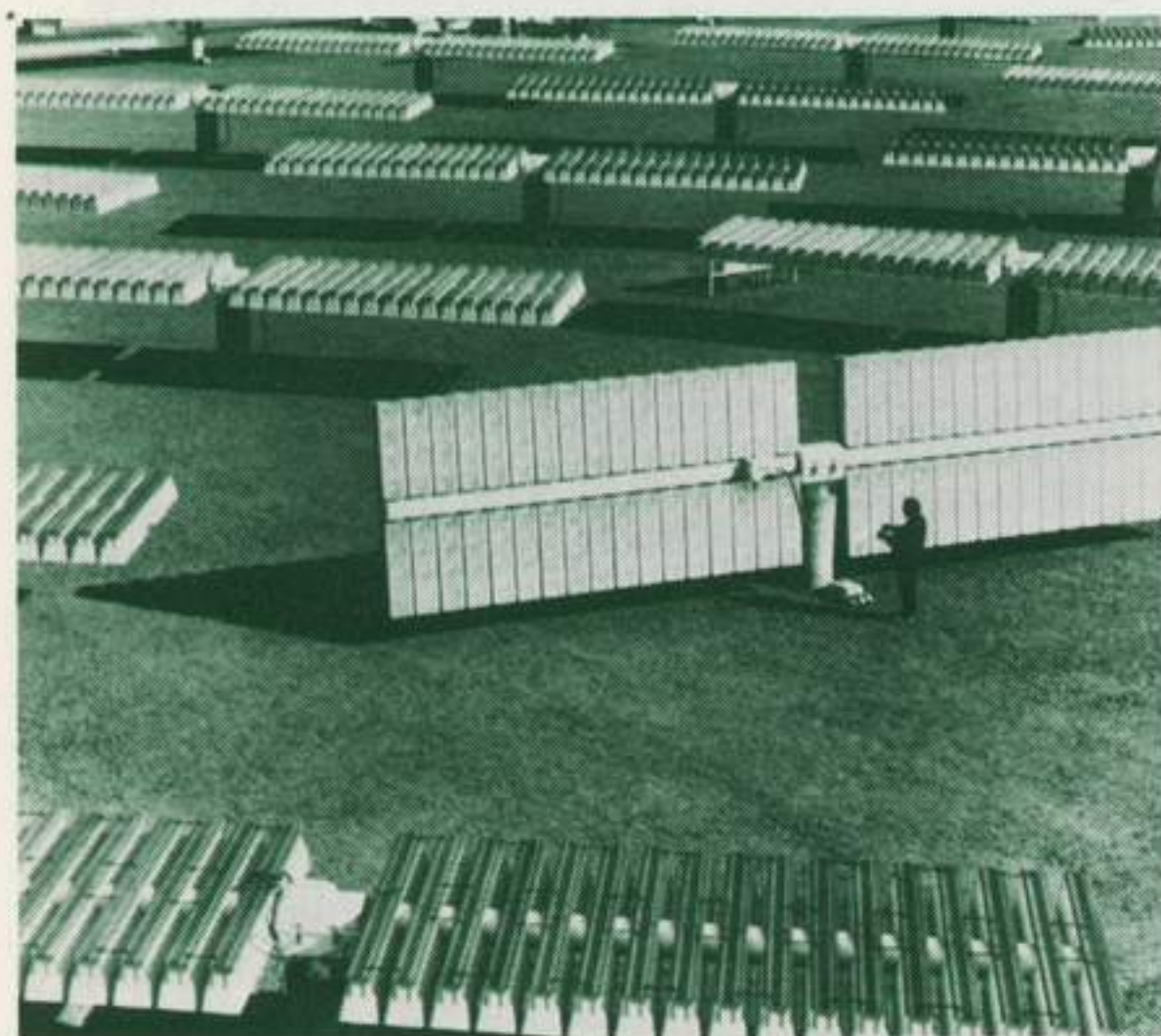
Michoud is working with the Space and Electronics Systems division on possible space station designs, and has developed a concept using external tanks as a space platform.

Technical Operations pursues new technology through research and development

The major goal of Technical Operations is to improve the company's technology base through increased independent and contractual research and development.

Technologies are pursued selectively for their likely application to future business.

A prime example this year has been ad-



A technician tests the concentrating photovoltaic array at the solar generating facility near Sky Harbor International Airport, Phoenix. The array was designed and built for the Arizona Public Service Company by Denver Aerospace.

vanced automation and robotics technology for space applications.

Some of the technology has been applied to designed for teleoperator maneuvering systems that can be used for payload delivery and retrieval, and for routine and contingency on-orbit servicing of other space systems.

One concept mates a TMS with a remote operations servicing system that could be controlled from Earth, eliminating requirements on the Shuttle orbiter.

Other projects on which Technical Operations has been working this year include three experiments for the Galileo probe of Jupiter expected to be launched from Shuttle in 1986: the nephelometer for cloud measurement; the atmosphere structure instrument to analyze Jupiter's atmosphere; and the net flux radiometer to measure energy radiated from Jupiter and the Sun at different levels in the planet's atmosphere and from bare ground.

The IRIS system, for infrared imaging of Shuttle, successfully produced information on the re-entry temperatures of the lower surfaces of the Shuttle orbiter Columbia on the third flight. The output is a computer-generated color photograph.

Solar Energy programs has rejoined Technical Operations after completion of its manufacturing programs.

Denver Aerospace efforts in solar energy began in Technical Operations. It became a product area when major power plant contracts were won.

"Although we are the largest producer of solar power in the world," James W. McAnally, Technical Operations vice president said, "the business has not grown as rapidly as expected. Until the market develops more fully, we are folding the effort back into Technical Operations.

"We will keep all open commitments to our customers," he said, "and we will continue to pursue technology contracts for both photovoltaic and thermal solar power plants."

Martin Marietta Aerospace is the top-ranking company in the Department of Defense research and development activities, and Denver Aerospace accounts for the largest single portion of that effort.

In 1982, Technical Operations had new and follow on orders worth more than \$20 million. The backlog for 1983 is in excess of \$18 million.