

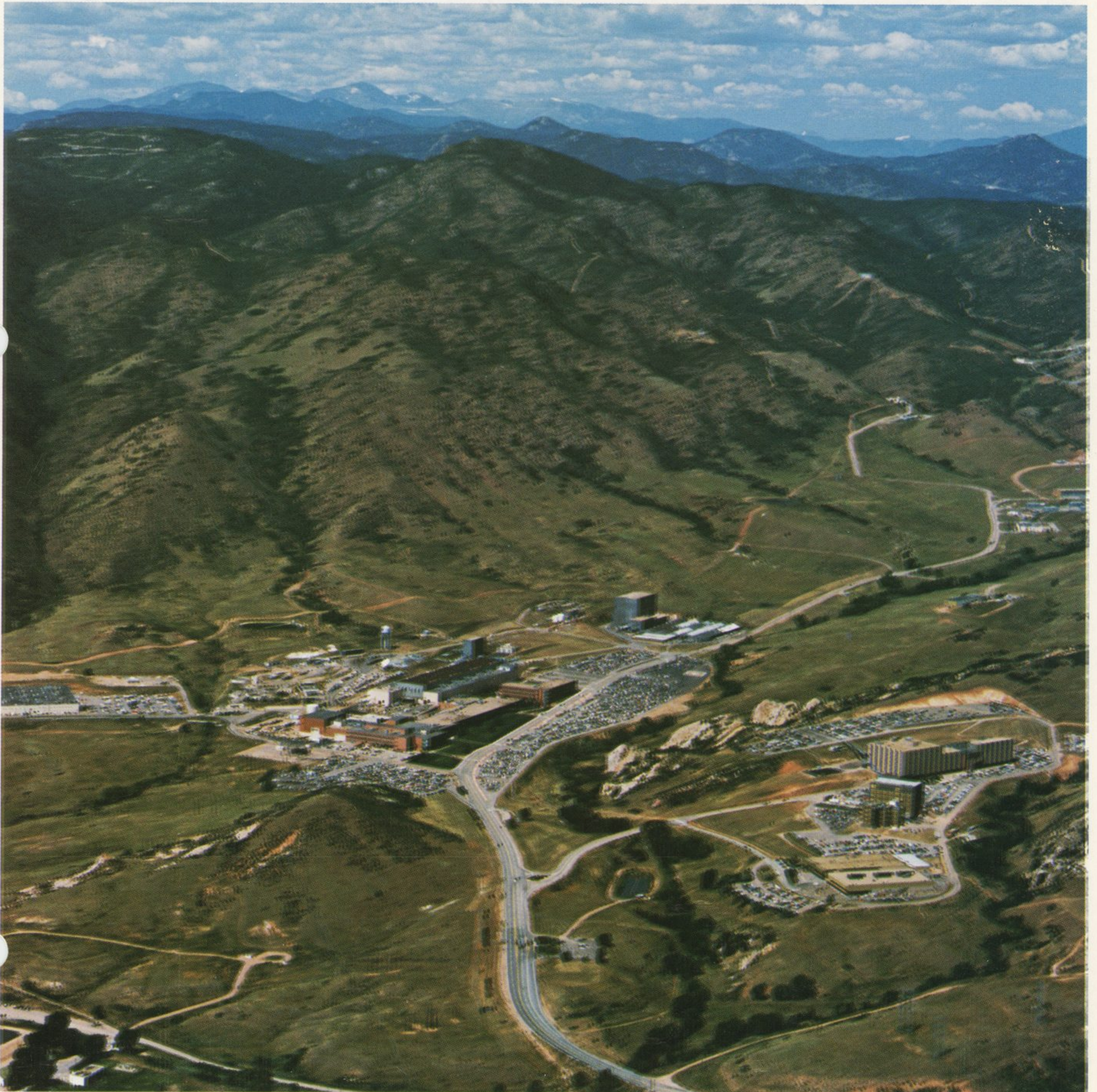
MARTIN MARIETTA

news

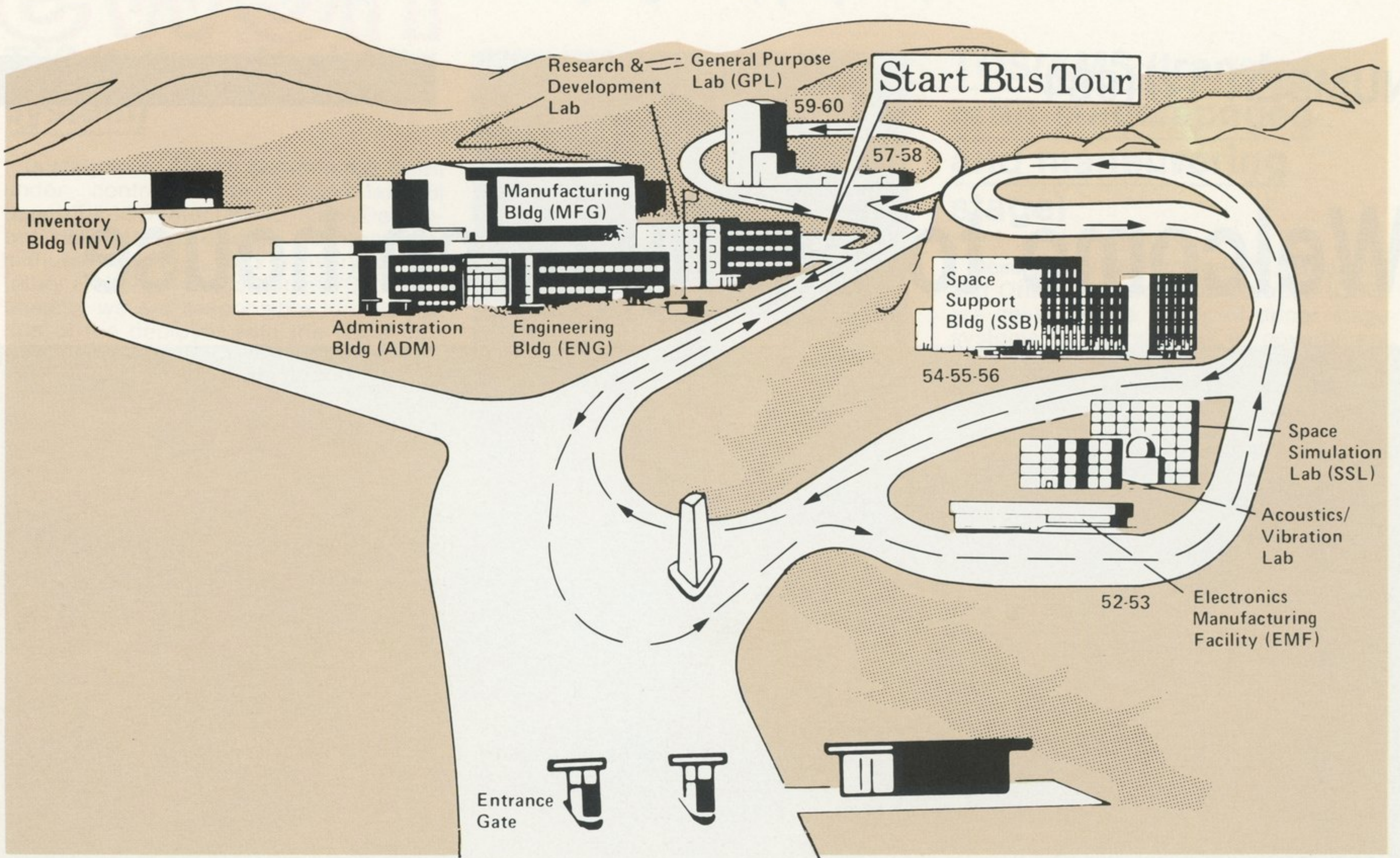
DENVER AEROSPACE

NUMBER 17/1984

Welcome to family open house

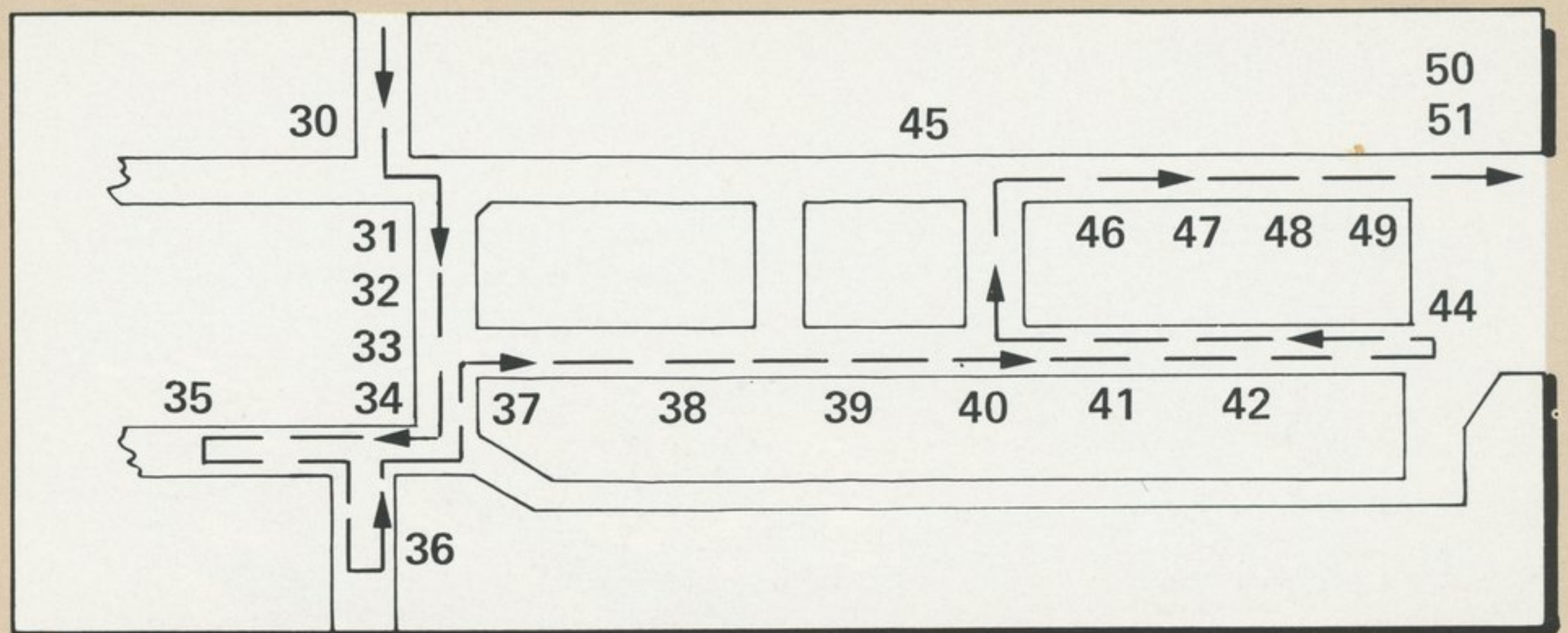


Sites, facilities along family open house tour route



Manufacturing Building

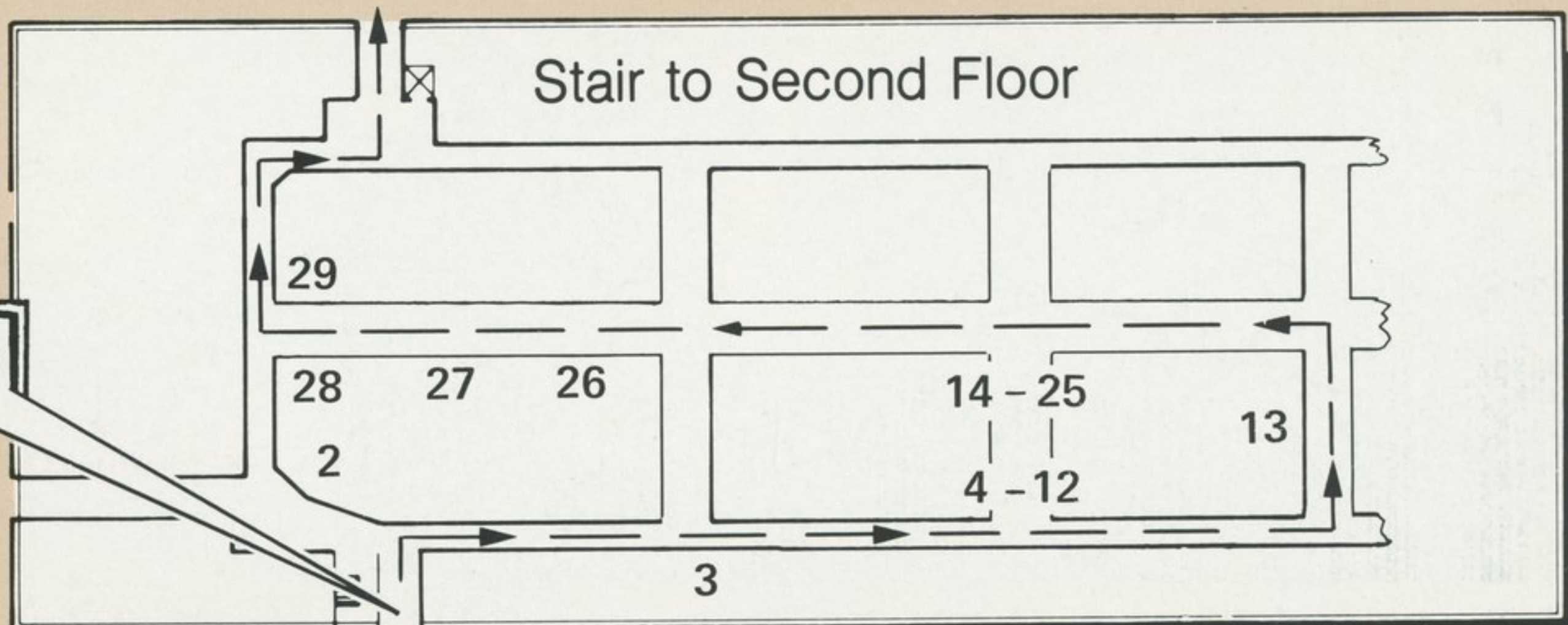
Second floor



First floor

Start Tour

Enter from Cafeteria Aisle



Legend, explanations to map and diagrams on opposite page

Engineering Building

- 1 Second floor—cafeteria (theater)
—Showing of films

Manufacturing Building

First Floor

- 2 B-1B horizontal stabilizer panels
- 3 Quality control display
- 4-12 Precision manufacturing on milling and drill press machines
- 13 Chemmilling display
- 14-25 Precision manufacturing on lathes
- 26 McKay forming press, 24 feet, 200 ton capacity
- 27 Farnham rolling machine, 1/4 in. x 24 ft capacity
- 28 Hufford stretch press, 60 ton capacity
- 29 Pacific power brake, 24 feet, 400 ton capacity

Second Floor

- 30-36 Titan fixtures and components
- 37 Transfer orbit stage
- 38-43 Peacekeeper emplacer and transportation and handling equipment
- 44 "Move Safe" display
- 45 Electrical harness fabrication
- 46 Titan III transtage 05D4
- 47 Titan III stage I assembly
- 48 Titan transition skirt assembly
- 50 Graphite epoxy space platform structure
- 51 Honeycomb structure (solar array)

Bus tour starts at the north door of the

Manufacturing building and proceeds east on main road to the EMF building.

Electronics Manufacturing Facilities (EMF)

- 52 Second Floor
— Assembly work areas
— Electronics manufacturing

EMF Cafeteria

- 53 First Floor
— Space history exhibit: Gemini, Mercury spacecraft, Apollo command module, Apollo lunar module, Skylab (C physics exhibit), U.S. Space Transportation System

Space Support Building—South

- 54 Class 100,00 clean rooms
— Tank fabrication laboratory
— Precision assembly & test
— Mechanisms laboratory: manned maneuvering unit (STS-41B, February 1984)
- 55 Near field facility (antenna testing)
- 56 SSB—Cafeteria
— Space art display
— Theater—Astronaut Vance Brand, commander, STS 41B

General Purpose Laboratory (GPL)

- 57 MSR van—countermeasures signals training set

- 58 The Gallery
— Spacecraft exhibits of past, present, and future programs
- 59 PACOSS display
- 60 Space operations simulator
— Simulator
— Solar Max
STS—cargo bay

RDL North Parking Lot

- 61 Food area
- 62 Entertainment area
- 63 Gifts area

Optional Visitation Sites

To keep the duration of the tour in a manageable timeframe, it was necessary to omit certain facilities from the standard tour route. However, the following locations are in a "display-ready" status and may be visited if you so desire.

Administration Building

- Central software engineering facility (CSEF)—Room 105
— CSEF computer center
— Terminal demonstrations
— RAMTEK E & S
(understanding fundamental orbits)

Space Simulation Laboratory

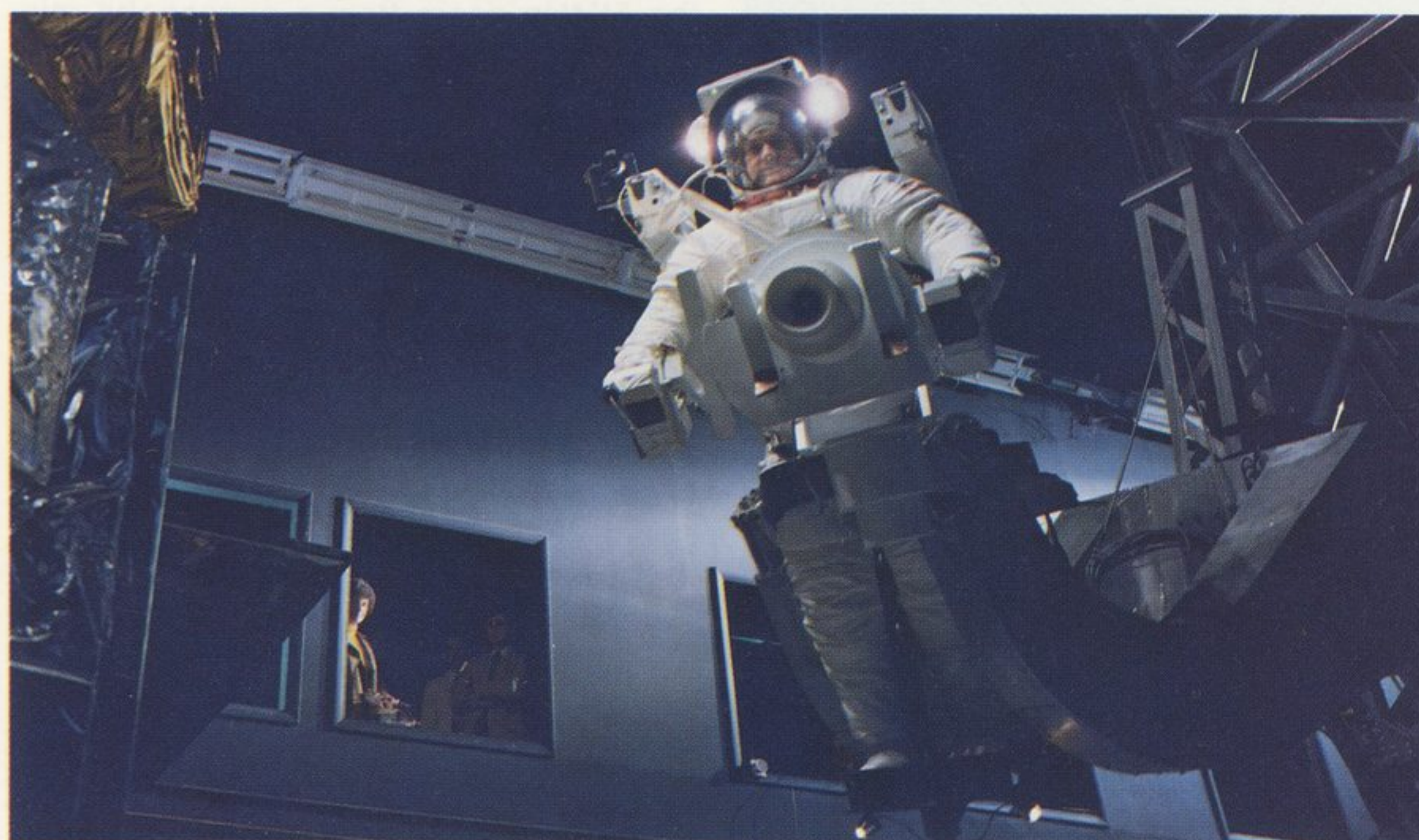
Vacuum chamber (first floor only)

Research and Development Laboratory (RDL)

- Robotics laboratory—Room 305

Engineering Building

- Computer engineering design systems (CAD/CAM)—Room 230



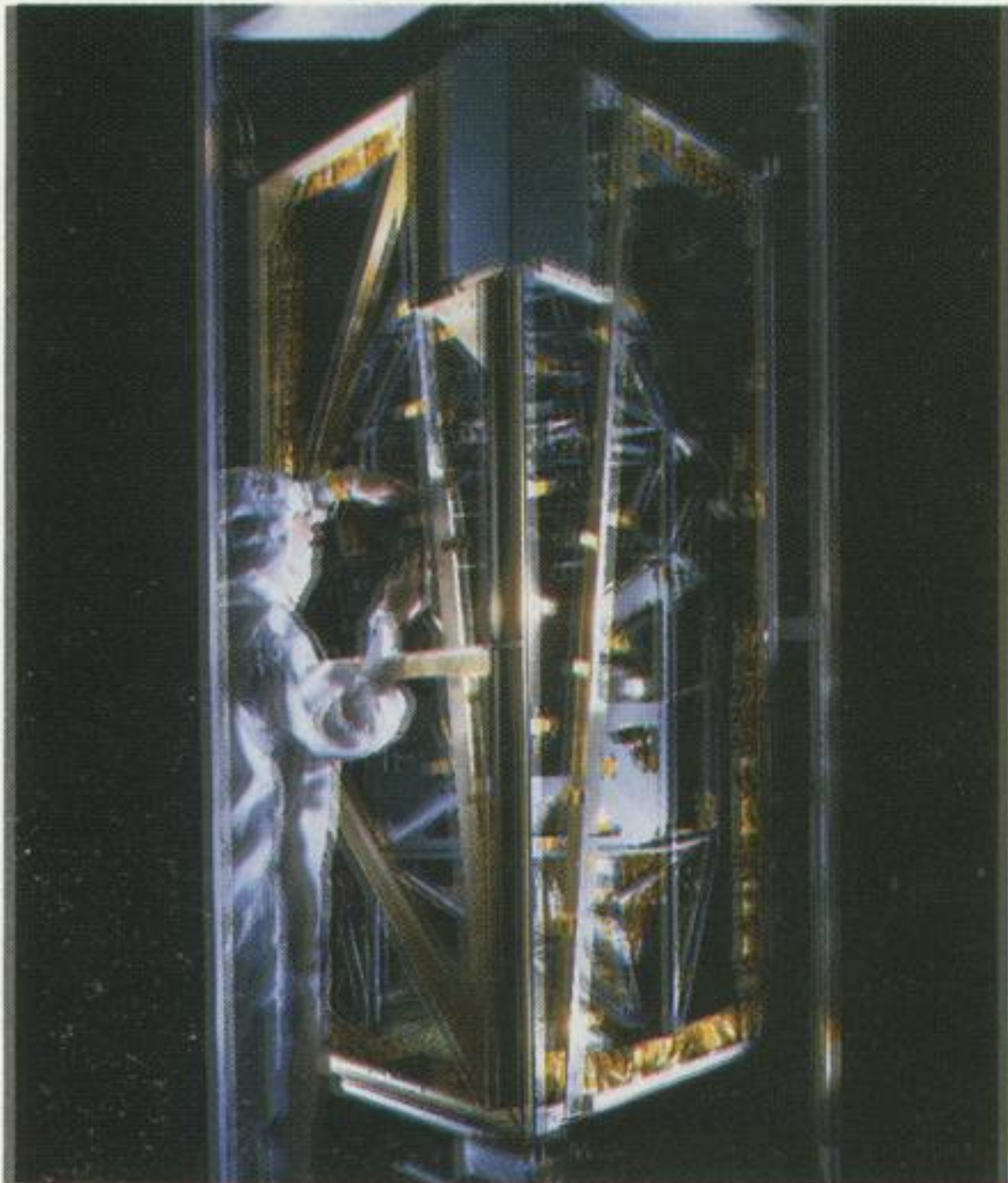
MMU in space operations simulation lab

In case of emergency . . .

Plant protection, telephone extension 7-4646, is the contact for assistance in the event of injury or illness during the family open house today. That same extension should be used for motor vehicle trouble or to locate missing children.

Programs . . . , Projects . . . , and . . .

FOS (faint object spectrograph)



Description: The FOS program, under a \$25 million contract to NASA's Goddard Space Flight Center, began in February 1978. Martin Marietta, teamed with the University of California at San Diego, designed, built, and tested a high-sensitivity astronomical spectrograph for use on the space telescope. The FOS and other space telescope instruments will enable man to explore far reaches of space, uninhibited by the Earth's atmosphere, to expand man's knowledge of space.

Status: Development of the FOS neared completion last year with the delivery of the instrument to Goddard. Current FOS testing will lead to integrating the instrument into the overall space telescope program. Two additional support contracts were initiated last year to provide continuing engineering and scientific support for the FOS.



MMU/FSS (manned maneuvering unit/flight support system)

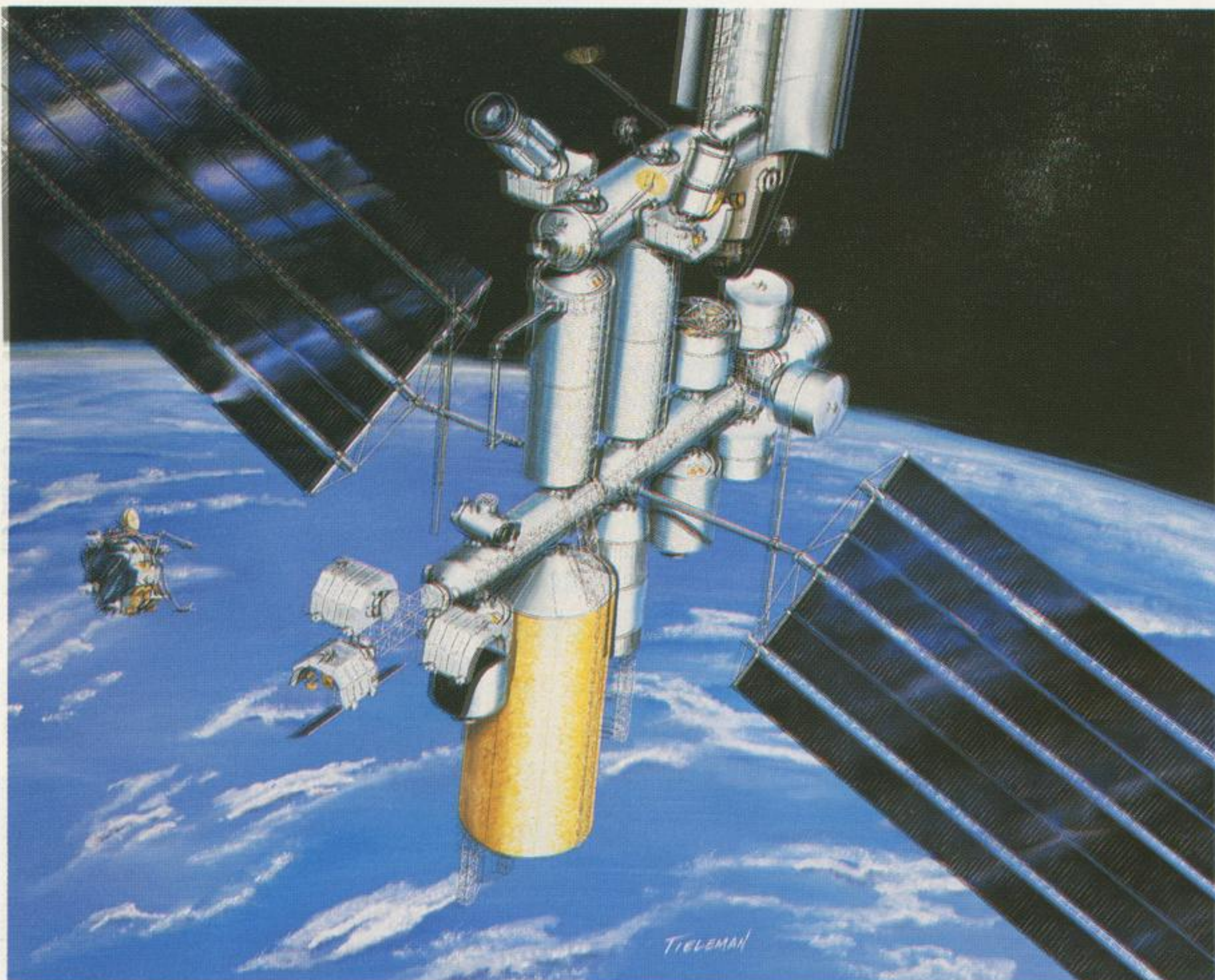
Description: Martin Marietta developed the MMU/FSS under contract with NASA/Johnson Space Center. The MMU/FSS provides man the capability to operate untethered during extravehicular activity (EVA), thus providing a tool that can be used to assemble, service, and repair spacecraft including a permanently manned space station.

Status: 1983 culminated 10 years of intense engineering and manufacturing effort necessary to deliver two flight units and associated ground support equipment. Both flight units were flown in February 1984 on the space shuttle. In more than five hours of flight, both units performed flawlessly, and a major milestone was achieved in the permanent presence of man in space. In April 1984, the MMUs again flew a successful mission from the shuttle to repair the solar maximum observatory satellite. Total cost of MMU development was \$45 million, with the cost of additional units estimated at \$10 million each.

Transtage

Description: Transtage is an upper stage used in conjunction with Titan launch systems. It is used as the fourth stage of the Titan to boost single or multiple payloads weighing up to 4200 pounds into geosynchronous orbit. With its ability for multiple starts, transtage has deployed as many as eight satellites during a single mission.

Status: Martin Marietta has an order from the Air Force to build two transtages for delivery in August 1985 and September 1986, respectively, and to buy materials for a third.



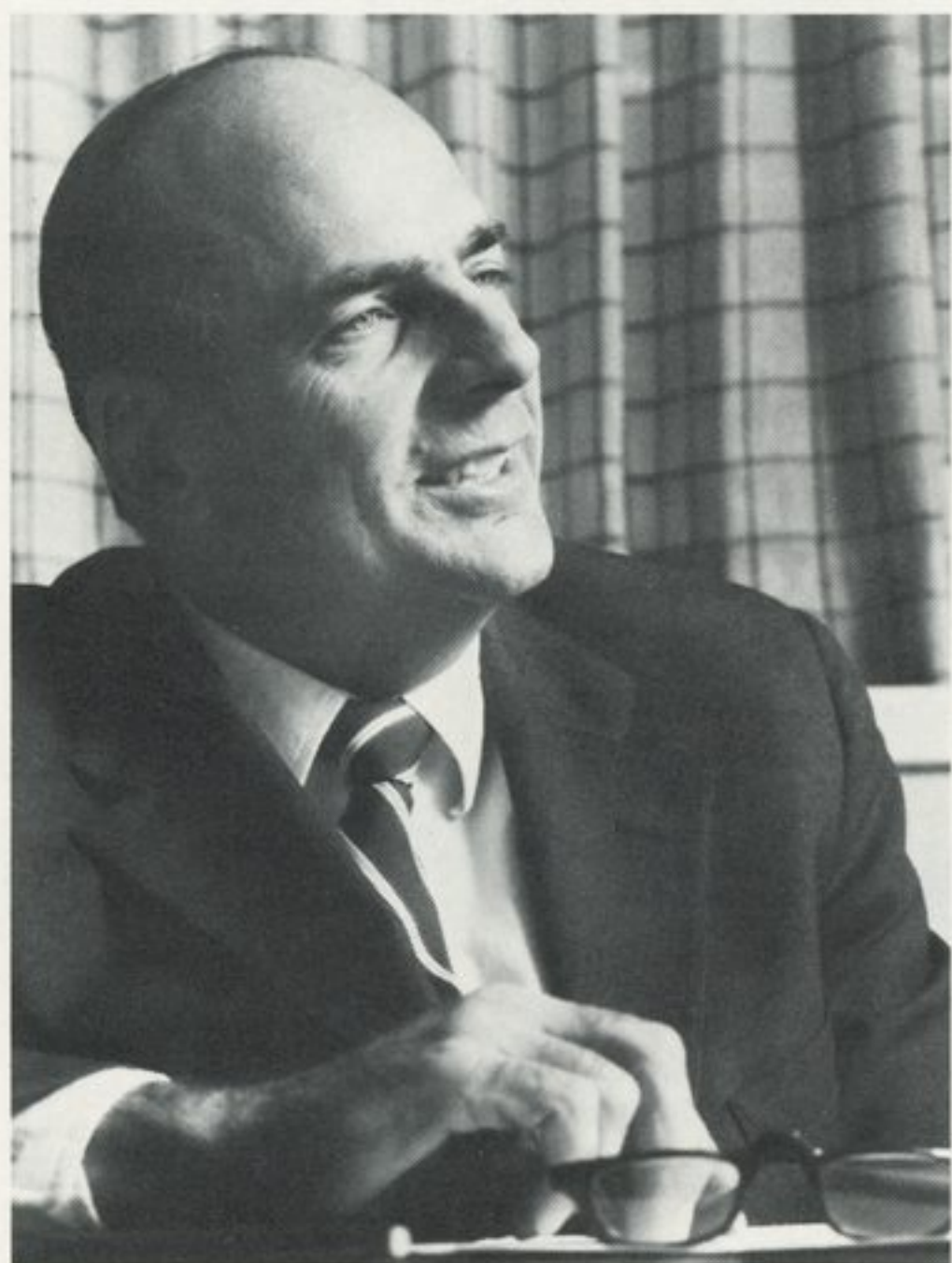
Space station

Description: Martin Marietta has assembled a team that includes veterans of the Skylab and other programs to pursue for the company a share of space station business that could amount to \$1 to \$2 billion during the next decade. From 35 to 50 people at Denver and Michoud have been working on space station activities from the beginning of 1984. Denver Aerospace was one of eight companies to conduct preliminary studies of a space station

under contract to NASA in 1983.

Status: NASA is considering a number of alternative space station design concepts and has assigned work packages to four of its centers. NASA is expected to request proposals by late August or early September for definition and preliminary design work that will lead to selection of a single concept. Award of competing contracts for various definition/design activities is expected early next year.

Augustine welcomes open house visitors



I am pleased to welcome our Martin Marietta families to today's open house. Many of you, I know, have not previously had an opportunity to tour our plant. This day has been planned to give you some appreciation for the breadth of our projects and programs as well as the facilities we have to support them.

But in the final analysis, it is our employees, with the support of their families, that have made possible the splendid success and excellent reputation that Denver Aerospace enjoys among its customers.

Thank you for coming, and I hope you enjoy your visit here.

Norman R. Augustine
President



Space sextant

Description: The autonomous navigation and attitude reference system, or space sextant, is an instrument designed to enable Earth-orbiting satellites to determine their own positions in space. It is the only autonomous navigation system in the world.

Status: Martin Marietta designed and built the space sextant for the Air Force under an \$18 million contract.

ASMPS (automated staff message processing system)

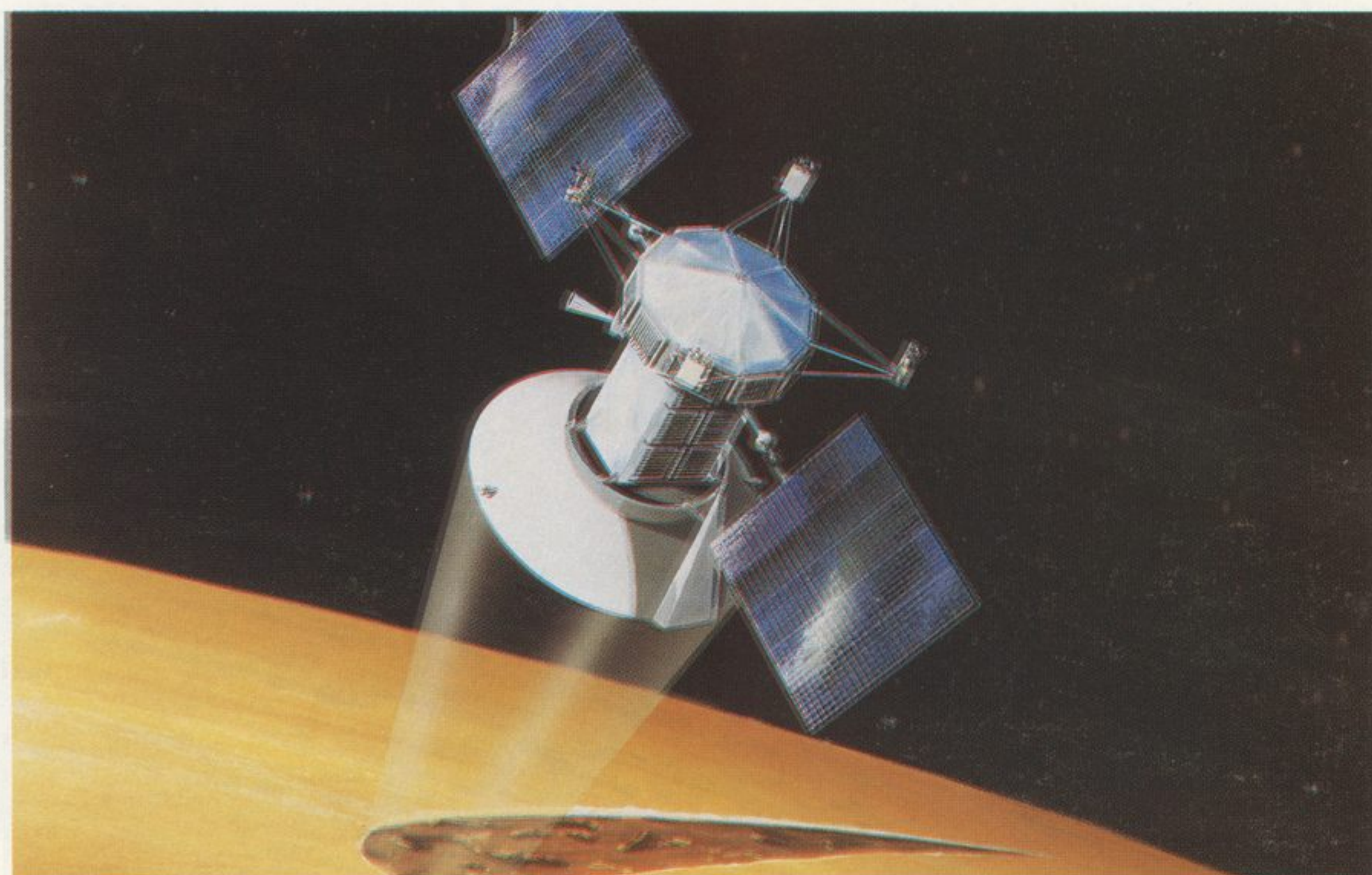
Description: The ASMPS is a mobile tactical communications center, with military designation of AN/TYC-16, that enables military decisionmakers to exchange rapidly battlefield information regarding enemy strengths, positions, and activities. It automates the previously all-manual preparation, transmission, reception, and distribution of tactical record message traffic. The computer hardware is transported in a standard Army truck shelter and a trailer.

Status: Six dual-shelter systems were developed under an \$8.2 million contract to the Army and have been deployed operationally in Europe since early 1983. The improved single-shelter version, the standard tactical operations facility (STOF), is undergoing Army field tests and evaluation in Europe. The potential is total replacement of the Army's existing message processing systems and expansion into the other services.

VRM (Venus radar mapper)

Description: The VRM contract with the Jet Propulsion Laboratory was announced in December 1983. The \$120-million program covers design, development, manufacture, test, delivery, and mission support for the VRM spacecraft. VRM, using a customer-furnished synthetic aperture radar, is intended to map the surface of Venus. VRM is unique in that it uses spare and other residual hardware from other planetary programs. That approach is intended to reduce the cost of unmanned planetary spacecraft and represents a challenge to integrate existing and new hardware.

Status: Engineering design and interface activities are underway. VRM is scheduled to fly in early 1988.



More programs and projects . . .

Peacekeeper AT&SS (assembly, test, and system support)



Description: Assembly, test, and system support (AT&SS) is a critical element of the Peacekeeper missile system, an advanced intercontinental ballistic missile (ICBM) being developed by the U.S. Air Force. The AT&SS effort provides for multiple development tasks and basing study efforts. It provides instrumentation and flight system safety (IFSS) hardware

for both airborne and ground support equipment, transportation and handling (T&H) equipment, system engineering and analysis, missile emplacer equipment, assembly and checkout planning, logistics, and the conduct of the Vandenberg Air Force Base test program.

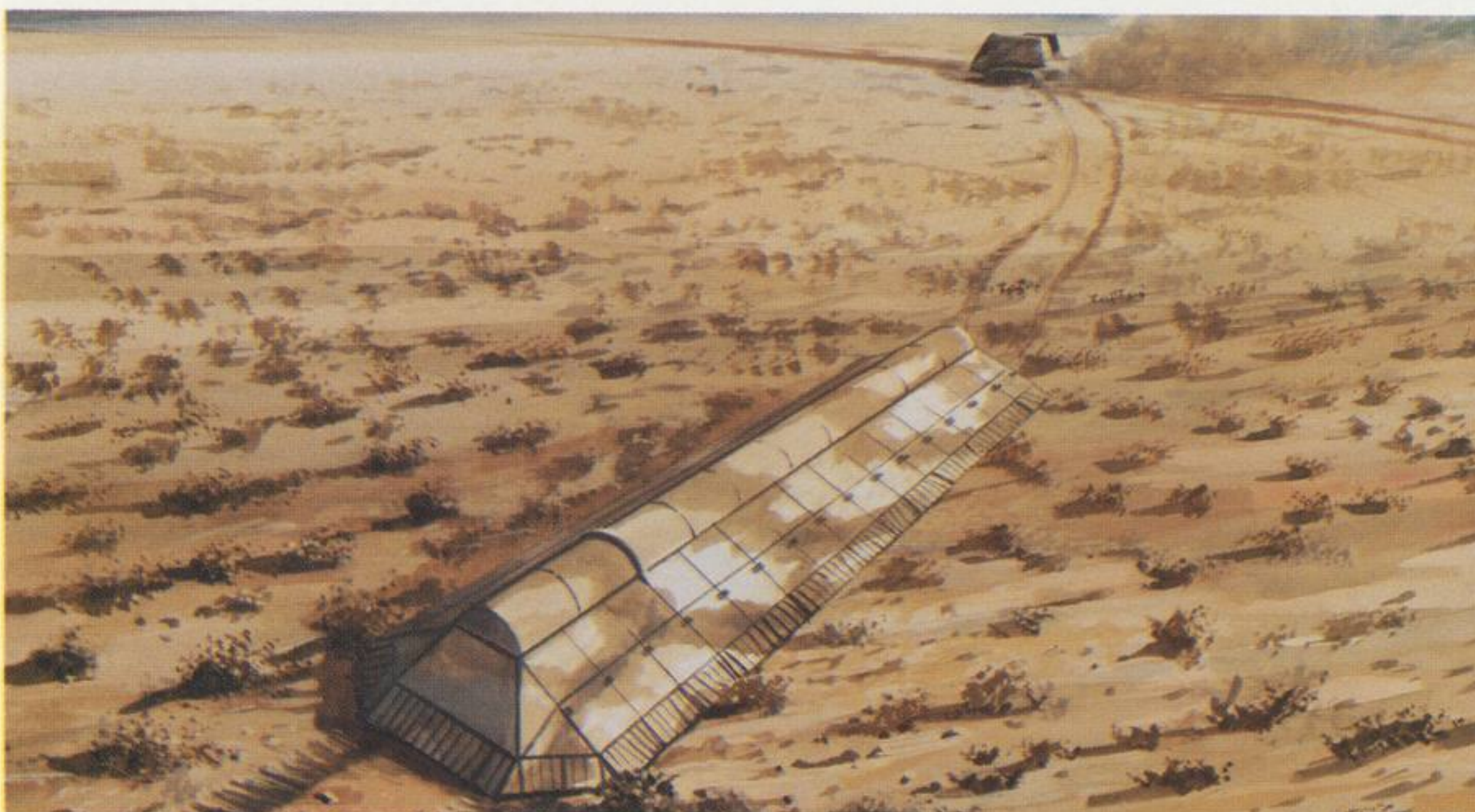
Status: Systems design, analysis, development, and fabrication of IFSS and T&H equipment to support the flight test program are complete. Vandenberg test facilities are fully operational, and the flight test program is well underway. As of August 6, 1984, the first five test flights had been conducted successfully. Earlier this year, Martin Marietta won a \$684 million follow-on contract to continue the AT&SS effort into the development test and evaluation (DT&E) and operational test and evaluation (OT&E) phases. The contract covers the period from June 1984 through July 1987. Martin Marietta anticipates a major role in the deployment of Peacekeeper missiles in Minuteman silos. That effort is expected to begin March 1985 with an initial value of approximately \$250 million.

Small ICBM—hard mobile launcher

Description: The hard mobile launcher for the small intercontinental ballistic missile (ICBM) is a part of the strategic modernization program being conducted by the U.S. Air Force. The hard mobile launcher is intended to protect the small missile from nuclear weapon effects and provides mobility to enhance survivability. The concept definition phase will involve preliminary design and small-scale testing to select configurations for validation during pre-full-scale development and full-scale development phases.

Status: The \$5 million contract was ini-

tiated February 22, 1984 and will be completed December 31, 1984. Martin Marietta won one of four contracts awarded. A \$1.6 million add-on to the contract for basing system definition studies also concludes at the end of the year. Small-scale testing has been initiated at the blast tube facilities in Colorado and New Mexico. Tests of up to one-sixth scale will be conducted at Martin Marietta facilities. Those test data and preliminary design studies will be the basis of competitive proposals for the next phase due to begin early in 1985. Two contractors are expected to be selected for that pre-full-scale development phase.



Small ICBM—weapon system definition/ missile integration

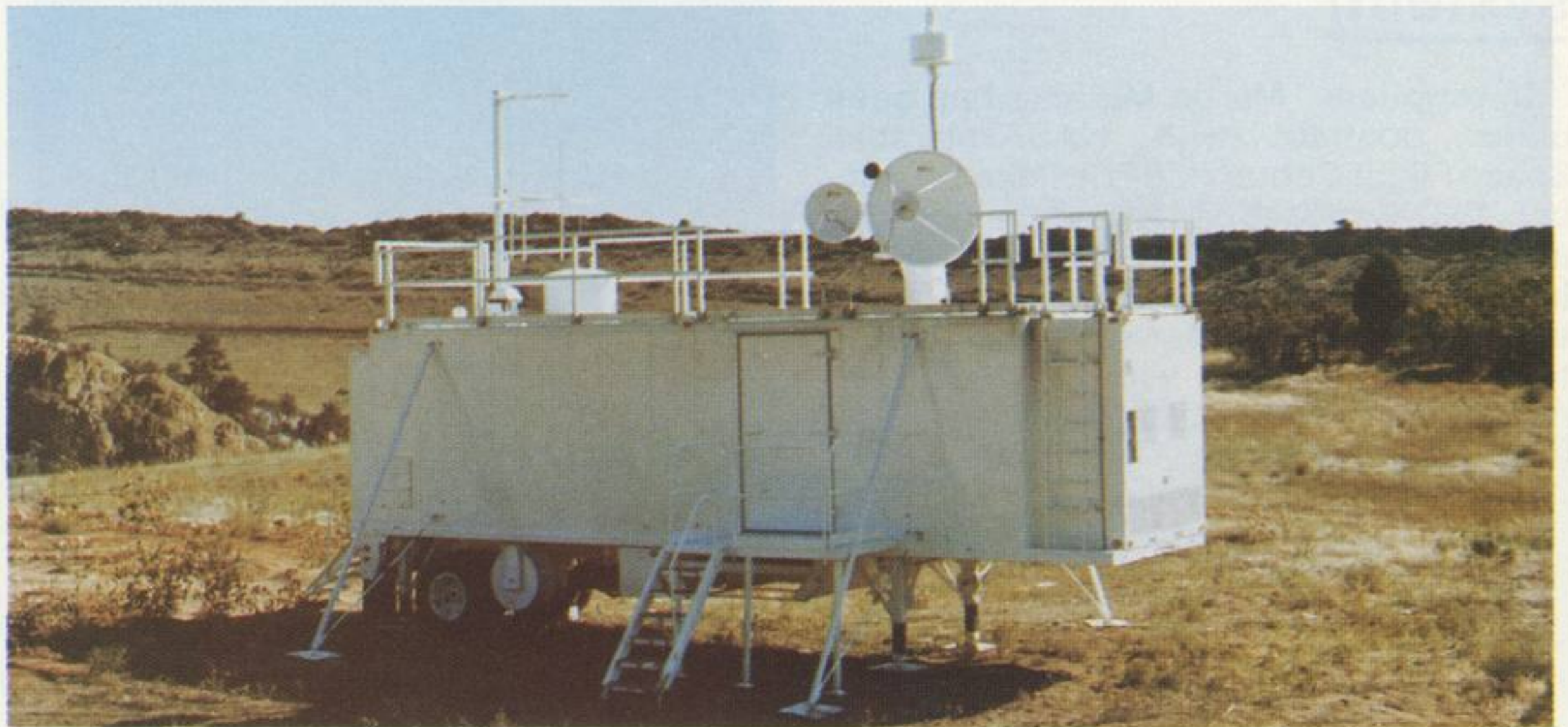
Description: The weapon system definition/missile integration effort is a key phase of the small intercontinental ballistic missile (ICBM) program that is part of the strategic modernization program being conducted by the U.S. Air Force. That effort prepares studies to address the preliminary design of the single reentry vehicle, 15-ton missile, and supports development of ground mobile operational and support concepts. Those studies will assist the Air Force in selecting the most promising missile configurations and mobile basing mode that will be validated during the pre-full-scale development and full-scale development phases.

Status: Martin Marietta Denver Aerospace was one of four companies awarded \$5 million contracts last December to do weapon system definition and missile preliminary design studies. Under a \$5 million add-on to the contract, the company will continue weapon system definition through March 1985. The company also will conduct missile definition optimization studies. Preliminary designs for two- and three-stage solid propellant missiles with a postboost vehicle to dispense the payload are being evaluated. Weapon system and missile studies midterm results will be used to write competitive proposals for the pre-full-scale development phase late in 1984. The Air Force plans to make award a single contract for that next phase early next year.

AN/MSR-T4 countermeasures signals training set

Description: The AN/MSR is a van-mounted automatic electronic warfare signal receiving system that will be used at Air Force Strategic and Tactical Air Command (SAC and TAC) training ranges. It evaluates the proper application and operation of airborne electronic countermeasure (ECM) equipment and tactics.

Status: Program was initiated in 1981 under a \$30 million contract and has a current value of \$44.3 million for seven systems, operational software, and logistics support. The first system was delivered to the SAC range at La Junta, CO, in February and is undergoing field tests. Second system began field tests last month at TAC range at Nellis Air Force Base, NV.



CCMS (checkout, control, and monitor subsystem)

Description: CCMS is a major computerized subsystem of the space shuttle launch processing system at Kennedy Space Center (KSC), Johnson Space Center (JSC), and Vandenberg Air Force Base, CA. It processes data from the shuttle ground support equipment and monitors the status of vehicle and support systems before launch.

Status: Design and development were

SMARTS (simulation, monitoring, analysis, reduction, and test system)

Description: Since July 1981, Martin Marietta has been under contract with the Air Force Tactical Air Command (TAC) to develop, install, and test an automatic data processing system (ADPS) to support interface testing of Tactical Air Force command, control, and intelligence (C²I) systems. The initial capability will be installed in the tactical systems interoperability and support center (TSISC) at Langley AFB, VA. SMARTS will provide the capability to verify operational upgrades to C²I systems by generating scenarios, controlling test operations, and reducing test results in a testbed environment. Future options include expansion of the Langley capability and installation of similar systems at Tinker AFB, OK; Kelly AFB, TX; and Greenville, TX.

Status: Total contract value is \$20 million, with up to \$20 million more possible in options. Installation of the system at Langley is planned for early 1985. Exercise of future options is expected to begin the latter part of 1984.

initiated in 1975 under a contract with NASA/KSC valued at \$22.8 million. Six subsystems have been installed by the company at KSC, one at JSC, and two at Vandenberg. CCMS has performed successfully during all shuttle launches. Contract value has grown to \$158.8 million. Currently providing engineering support, spares, and hardware to augment capabilities at the launch sites.

Shuttle orbiter subsystems

Description: The spacecraft systems product area of the space systems division at Denver supplies a number of orbiter subsystems. That hardware includes: the solid rocket booster/decelerator subsystem (SRB/DSS); pyrotechnic initiator controllers (PIC); caution and warning (C&W) system; and the reaction control system (RCS) propellant tanks.

Status: All that hardware flew on each of the four space shuttle missions conducted during 1983 and on the two this year and performed with a 100 percent mission success record. Total value of the SRB program is \$45.6 million; PIC, \$12.8 million; C&W system, \$7.1 million; and RCS tanks, \$34.5 million.

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MILSTAR (military strategic tactical and relay satellite system)

Description: The MILSTAR intercontinental ballistic missile communication system is designed to provide jam-proof global communications for U.S. strategic and tactical forces. It is a joint program of the Air Force, Army, and Navy. The total system will consist of a constellation of satellites and terminals integrated into ships, planes, and ground forces.

Status: Martin Marietta is one of three companies with Air Force contracts through November 1984 to conduct parallel concept definition and validation studies to determine the most effective means of integrating the MILSTAR communications capability into the Air Force's missile weapon system. The contract is worth \$1.9 million.

Titan 34D

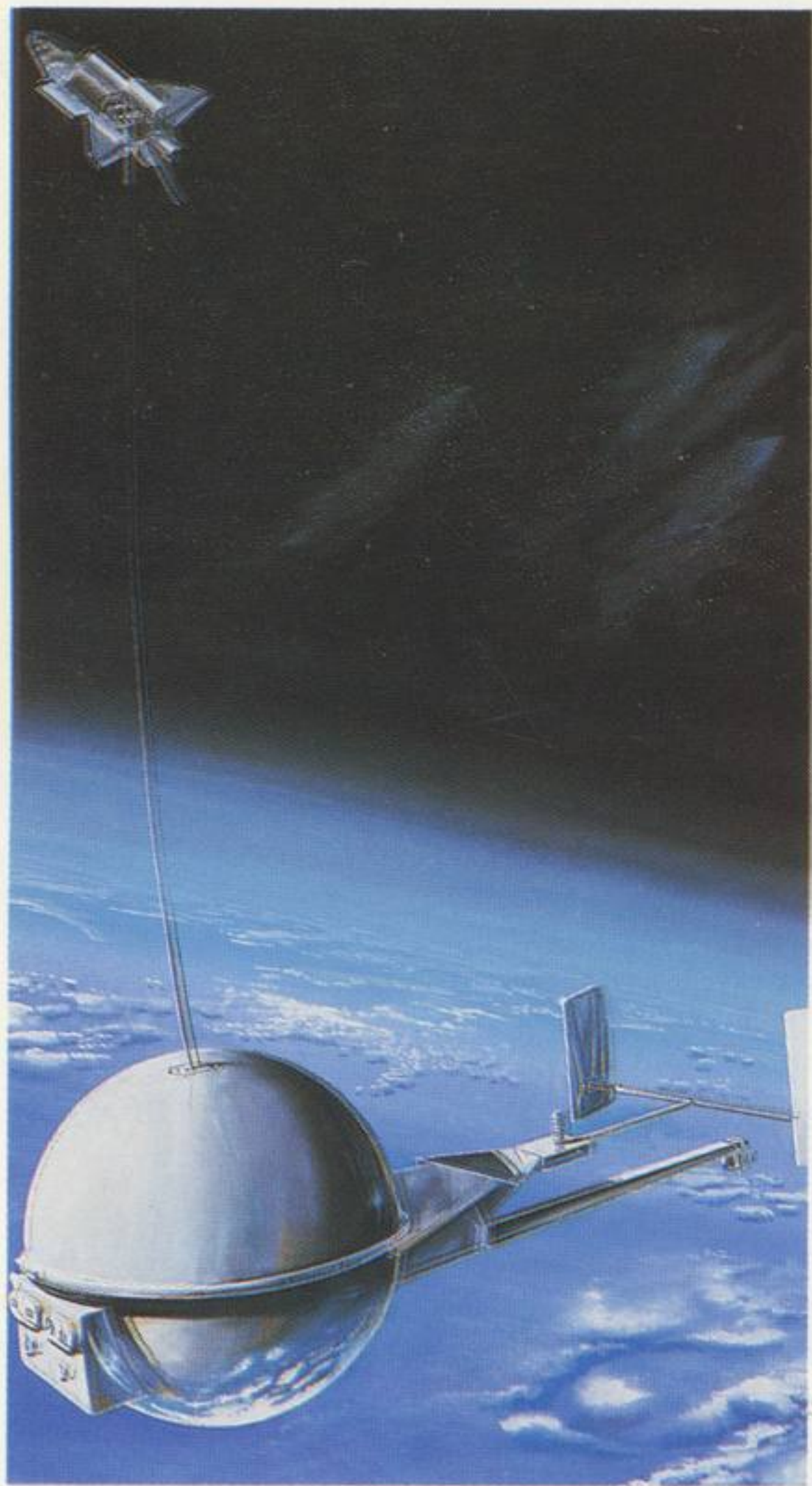
Description: Titan 34D is the newest member of the Titan III series of expendable space launch vehicles that has operated for a quarter of a century. Titan III has been the Air Force's principal launch vehicle for critical national security payloads since 1966. Designed and built by Denver Aerospace for the Air Force, the Titan III/34D series of launchers has successfully completed 125 of 128 operational launches as of July 1984.

Status: Denver Aerospace in June 1984 received an order worth up to \$69.5 million, if the Air Force exercises all its options, for a 34D and three transtage upper stages. The order is expected to extend Titan launch operations into late 1987.

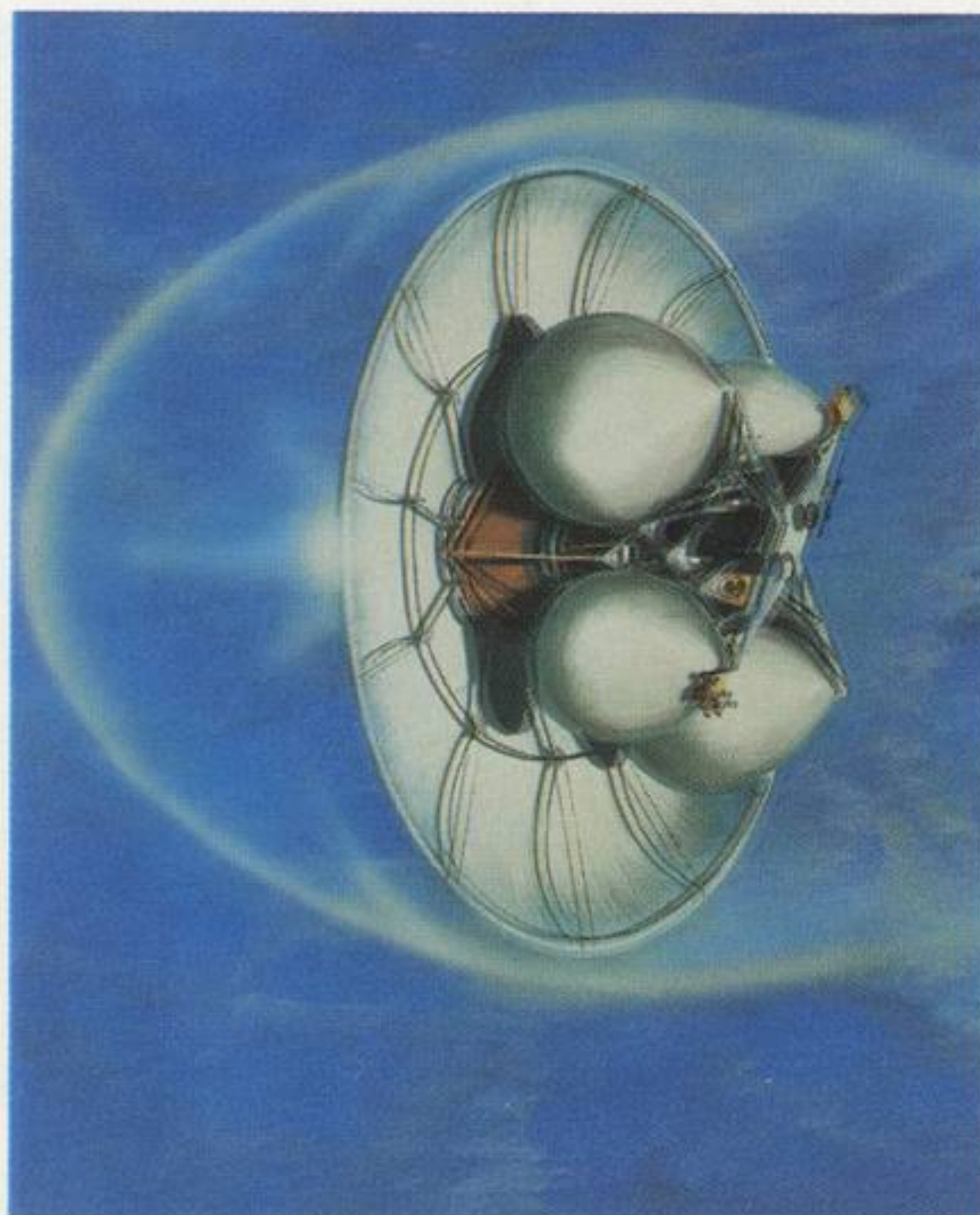
... Just a sampling of current programs, projects; the future holds more

TSS (tethered satellite system)

Description: Martin Marietta has been under contract with NASA/Marshall Space Flight Center (MSFC) since December 1982 for the design, development, manufacture, test, and delivery of the tether and deployer portion of TSS. Additionally, we are responsible for integration of the deployer with the NASA-furnished satellite payload. The initial satellite is being developed by the Italian firm Aeritalia under auspices of a United States/Italian government memorandum of agreement. The TSS is the first reusable tethered orbital satellite system and is scheduled for its first use onboard the space shuttle in late 1987.



Status: Total value of the contract is \$22.35 million. From December 1982 through December 1983, the TSS underwent definition studies and prototype subsystem development. MSFC authorized Martin Marietta to proceed with full-scale development in December 1983. Definition studies have confirmed the feasibility of deploying a satellite from the space shuttle cargo bay on a tether up to 60 miles long. Currently, engineering design and mission planning are underway for the first mission, which will conduct electrodynamics research by deploying a satellite approximately 12 miles out from the space shuttle using an electrically conductive tether.



OTV (orbital transfer vehicle)

Description: The OTV presently conceived by NASA initially will be an unmanned upper stage rocket vehicle used to transfer payloads in space from lower to higher orbits, particularly geosynchronous orbit. Designed to be reusable, it could be deployed either from the space shuttle or a future space station. NASA ultimately wants to develop a manned vehicle capable of ferrying a crew capsule to geosynchronous orbit. The vehicle would then return the crew and capsule for other missions.

Status: Denver Aerospace is one of two companies awarded June contracts by NASA's Marshall Space Flight Center to perform 15-month parallel OTV conceptual studies. Contract value is \$1 million.

Space shuttle GSS

Description: The ground support systems installation and checkout (GSSI&C) effort is a key activity in the development of the capability for the Air Force to support West Coast space shuttle operations. The effort provides for design, procurement, installation, and test of the various facilities and support systems required to launch and recover the space shuttle.

Status: Systems design and engineering development are mostly complete. Facility construction and equipment installations are underway along with the early phases of ground system test. Verification of the capability to process shuttle vehicles through the ground support facilities will be accomplished in late 1984. The Air Force plans to have an initial launch capability by October 1985. The value of that effort is in excess of half a billion dollars.

TOS/AMS (transfer orbit stage/apogee and maneuvering stage)

Description: Martin Marietta Aerospace and Orbital Sciences Corporation (OSC) are developing a family of upper stage systems for commercial or government use to boost satellites from low-Earth orbits to higher orbits and planetary escape trajectories. OSC, a technologically based management, marketing, and financial operation, has contracted with Martin Marietta for commercial development of the Transfer Orbit Stage (TOS) and the Apogee and Maneuvering Stage (AMS). TOS is a medium-capacity upper stage designed to place a 13,000-pound payload into geosynchronous transfer orbit, while the AMS is a liquid bipropellant propulsion module that can operate independently of, or in conjunction with, TOS. OSC and Martin Marietta also have designed a shortened version of the TOS for use with the shuttle for smaller satellite payloads and a TOS/AMS combination capable of delivering 6500 pounds to geosynchronous orbit.

Status: OSC and NASA signed the final agreement for commercial development of TOS in April 1983. OSC and Martin Marietta initiated the TOS definition contract in May 1983 and the \$35.5 million full-scale development contract was initiated last December. TOS development is expected to be completed in 1986, and TOS is baselined in the NASA budget to provide propulsion for the NASA Jet Propulsion Laboratory (JPL) Mars geoscience climatology observer (MGCO) mission.

