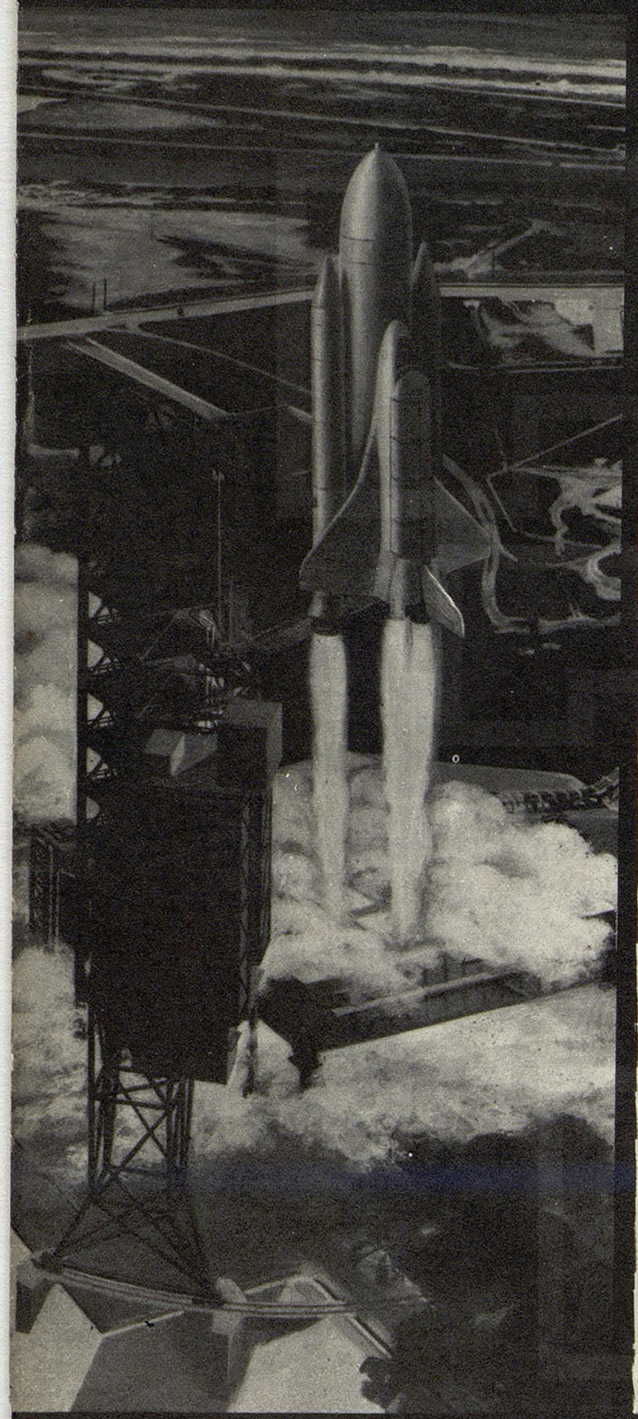


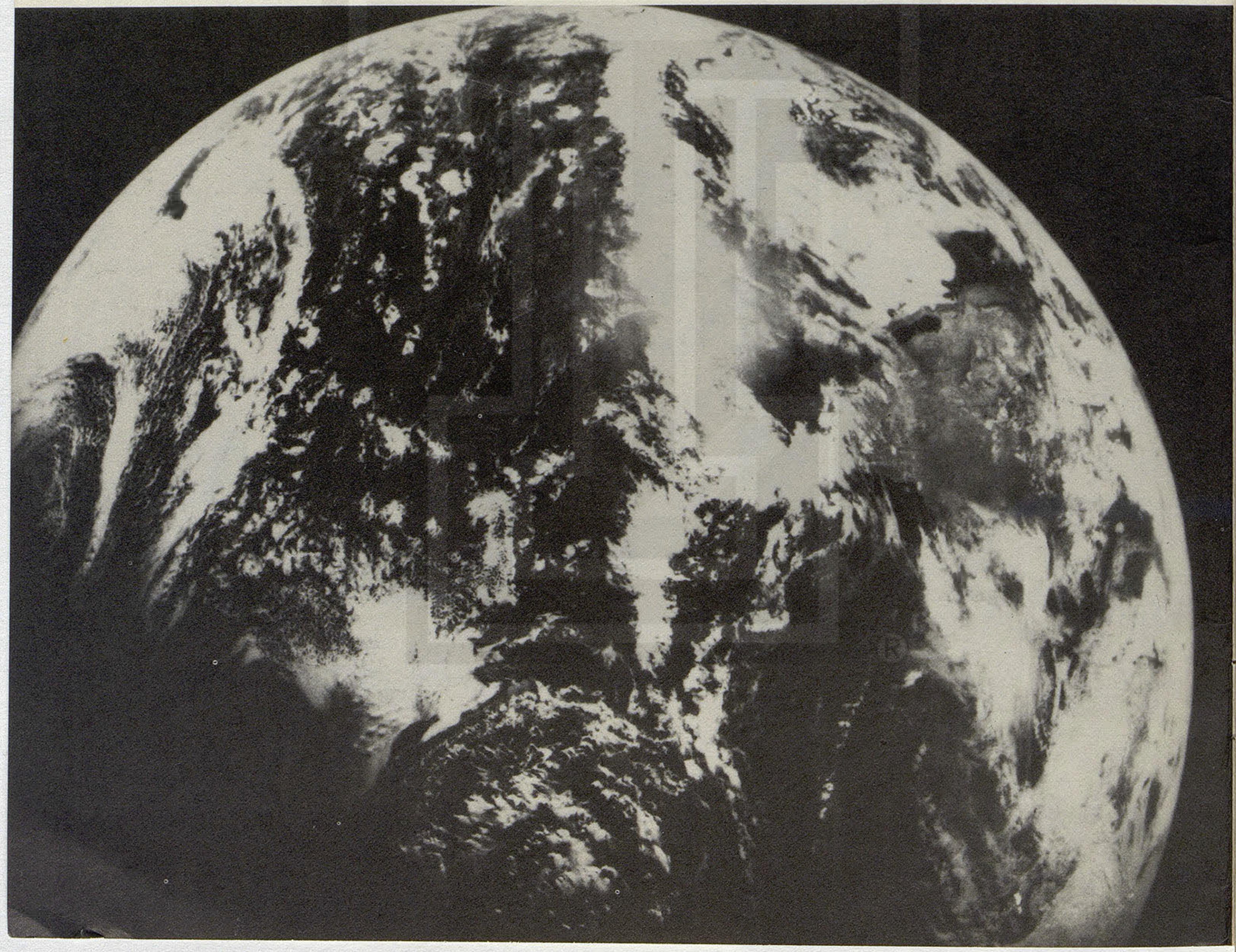
AMERICA'S SPACEPORT

NASA
National Aeronautics and
Space Administration

John F. Kennedy Space Center

"The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind."

National Aeronautics and Space Act of 1958
Section 102 (a)



The John F. Kennedy Space Center, NASA, is the threshold of outer space where since 1958 our nation has conducted a long-range program to explore the environment beyond the Earth's atmosphere, reaching out to the Moon, the Sun and the planets.

At the Center are the unique facilities and equipment required to receive, check out, test and launch medium and heavy space vehicles — such as Apollo/Saturn V, Skylab and the Apollo/Saturn IB for the Apollo Soyuz Test Project. Modification of some facilities and the construction of necessary new ones are currently under way to accommodate Space Shuttle missions beginning in 1979.

I trust that you will share our pride in these facilities and in our superb launch organization. They are key elements in the nation's effort to maintain pre-eminence in space.

Lee R. Scherer

Lee R. Scherer, Director
John F. Kennedy Space Center, NASA

BACKGROUND

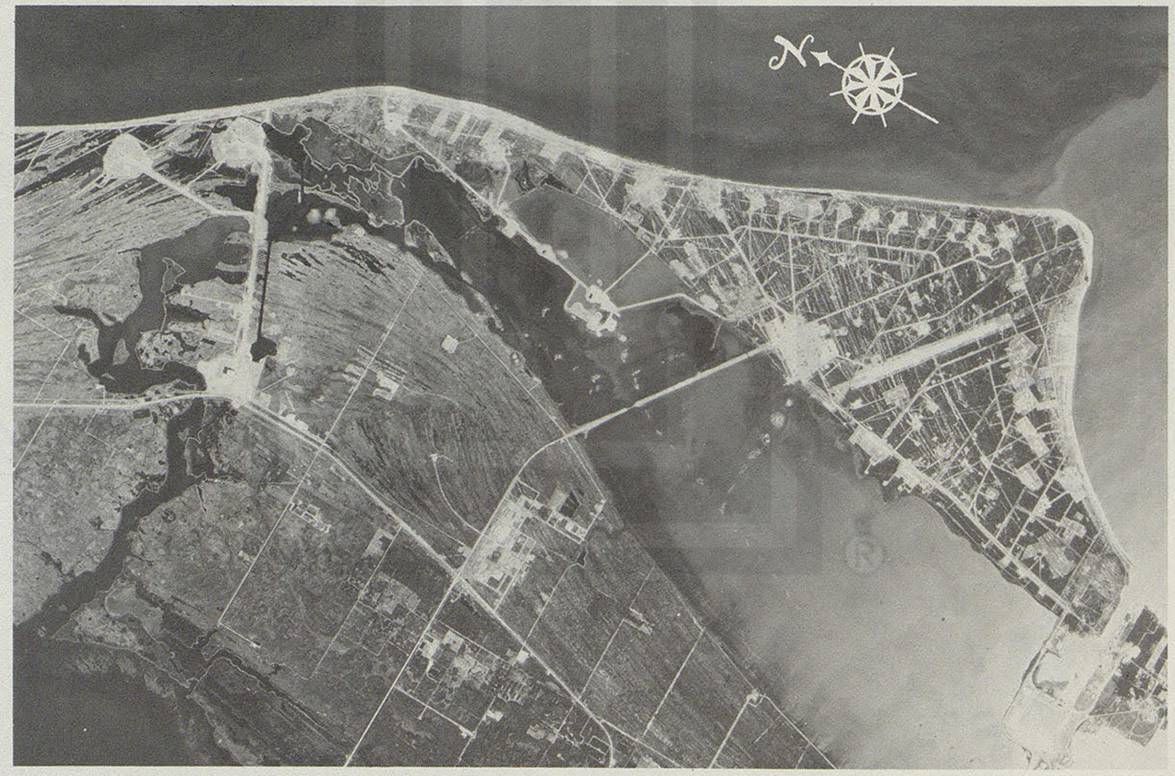
The National Aeronautics and Space Administration was established October 1, 1958. This was 12 months after the launch of Sputnik 1, the first man-made Earth satellite, and nine months after the launch of Explorer 1, the first United States satellite.

The short history of NASA reflects the complex task of initiating and implementing a national space program among various government agencies, industry and the scientific community, many of whose personnel and programs were already closely involved with space exploration.

The early focus of NASA's launch operations centered on Cape Canaveral. The antecedents of these activities date back to the years following World War II when the War Department selected the site as a testing area for long-range guided missiles. This spit of land jutting into the Atlantic Ocean was selected because of the chain of islands stretching southeastward to Ascension Island which could accommodate tracking stations to measure the trajectories and vehicle performance. The site was formally approved July 8, 1947.

Soon afterward, Congress authorized the acquisition and construction of the Atlantic Missile Range, now the Air Force Eastern Test Range. A Department of Defense facility, the range was assigned to the Air Force for management. Subsequently, the range was extended to the Indian Ocean, a distance of more than 10,000 miles. In addition to the Air Force, the Army and Navy also have utilized the range facilities in the development of rocket-powered weapons systems.

As the NASA program got underway, concentrating on the peaceful exploration of outer space, the Cape became the headquarters of the Launch Operations



Aerial view of Space Center and Cape Canaveral

Center, later renamed the John F. Kennedy Space Center, NASA. Also located on the Cape were field offices of NASA's Manned Spacecraft Center (now the Johnson Space Center), Marshall Space Flight Center, Goddard Space Flight Center, and the Jet Propulsion Laboratory, the latter a spacecraft design agency supported by NASA. With the orderly growth of the space program, NASA has become the prime user of the range.

In late 1964, the NASA Kennedy Space Center was relocated on adjacent Merritt Island. The site, selected in 1961, occupies some 84,000 acres of land and water; approximately 55,000 additional acres owned by the State of Florida are also under the control of the Center. Facilities were installed to accommodate enormously powerful space vehicles to carry men to the Moon and back, and to conduct the challenging Skylab and ASTP launches.

All but the operational areas of the Spaceport are designated as a national wildlife refuge, much of which is open to the public. In 1975, 41,000 acres of the Spaceport were designated as part of the Canaveral National Seashore.

Apart from its future role as a stepping stone for manned exploration of the solar system, the Spaceport is rich in historical heritage.

Numerous Indian burial mounds and middens (refuse piles) have been discovered, from which researchers have removed artifacts dating back to the time of Christ. Near the ocean, traces have been found of early Spanish activity.

Dr. Charles Fairbanks of the University of Florida has pointed out: "This was one of the areas where Western civilization came to the New World, and now it is the area from which our civilization will go forth to other worlds."

Alan Shepard enters Mercury spacecraft


Apollo 9 liftoff

MISSION

The John F. Kennedy Space Center is the major NASA launch organization for manned and unmanned space missions.

As the lead center within NASA for the development of launch philosophy, procedures, technology, and facilities, the Kennedy Space Center launches manned space vehicles, unmanned planetary spacecraft, and scientific, meteorological, and communications satellites.

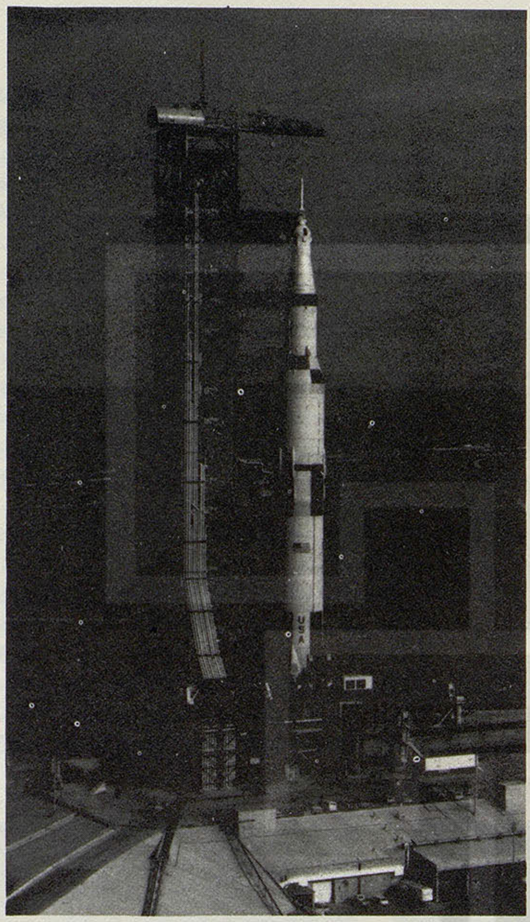
The mission encompasses planning and directing:

- Assembly of space vehicles
- Preflight preparations
- Test and checkout of launch vehicles, spacecraft, and facilities
- Coordination of tracking and data acquisition requirements
- Countdown and launch operations

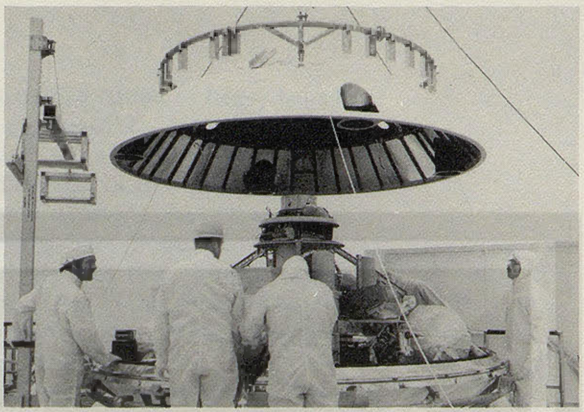
Supporting this primary mission are a host of technical and administrative functions. These include design engineering, safety, quality assurance, documentation, supply, maintenance, computer operations, testing and communications.

The Center's Launch Complex 39 has served as the launch site for American astronauts' journeys to explore the Moon, to occupy the orbiting Skylab space station and to dock with a Russian spacecraft on the first U.S.-Soviet joint manned space mission.

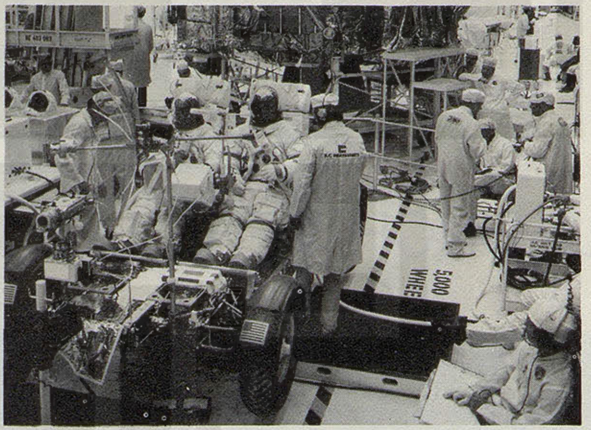
The Air Force Eastern Test Range, part of the Air Force Systems Command, operates and maintains the largest missile proving ground in the world. Cape Canaveral Air Force Station is Station 1 of the range which extends over 10,000 miles into the Indian Ocean. The Range's mission is to provide facilities and support services for launching missiles and rockets, and to gather useful data from the flights. Radar and optical devices track each rocket as it streaks across the sky while telemetry equipment detects and records vital information transmitted by tiny sensors aboard the space vehicle. The range supports NASA launches from the Cape and Launch Complex 39.



Apollo/Saturn V on launch pad



Viking spacecraft inspection



Apollo 17 crew checks out Lunar Rover

Firing Room, Launch Control Center

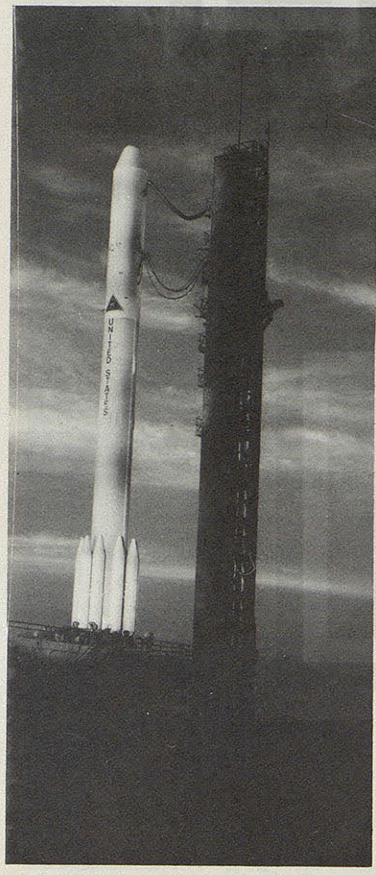
LAUNCH VEHICLES

The United States program depends on the ability of our scientists and engineers to provide the means for propelling spacecraft into orbit or on trajectories into deep space. A variety of launch vehicles are used to meet the needs of widely diversified missions.

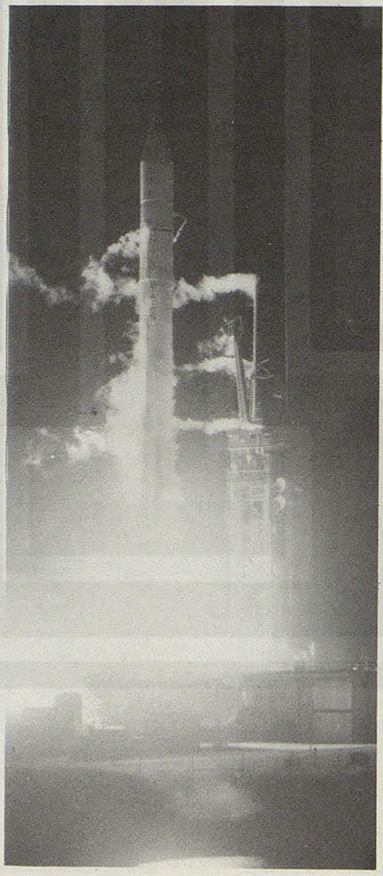
The flight path chosen for a payload determines what performance is required of the particular launch vehicle. Obviously, it would be impractical to use the most powerful launch vehicle to orbit a small, lightweight scientific satellite or to risk failure of a mission by placing too much weight on any launch vehicle.

For these reasons, the United States has developed a family of reliable launch vehicles of various sizes, shapes, and capabilities. The aim is to develop the smallest number of vehicles consistent with the full scope of the space mission.

Launch vehicles used for early space missions evolved principally from



Delta rocket on pad



Atlas/Centaur launch

Titan/Centaur liftoff

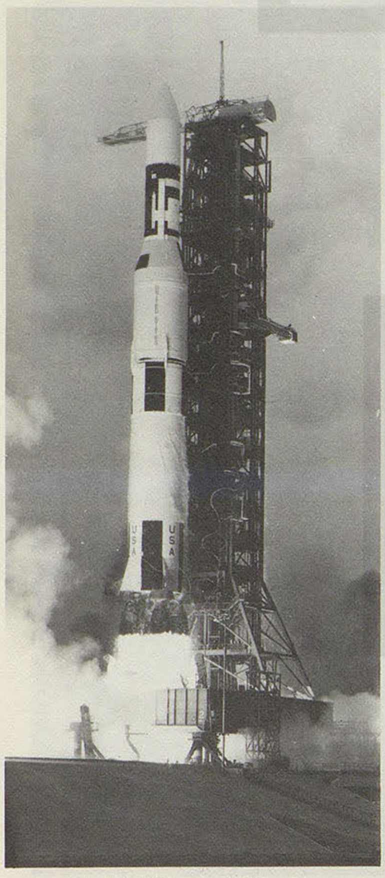
basic military systems developed and tested during the previous decade. Technological exchange between military and scientific projects continues to benefit the national space program.

The first United States satellite, for instance, was orbited by an Army-developed Juno I missile. Delta, the most frequently used booster in NASA's unmanned space program, employs components developed by the Air Force and Navy. Modified Army-developed Redstone and Air Force-developed Atlas boosters were utilized for the Mercury program, the nation's initial manned space flight effort. Modified Atlas boosters, some using hydrogen-fueled Centaur second stages, launched Ranger, Mariner and Pioneer spacecraft on highly successful missions and are used for Intelsat communications satellite launches. The Gemini launch vehicle was a modified Air Force Titan II booster.

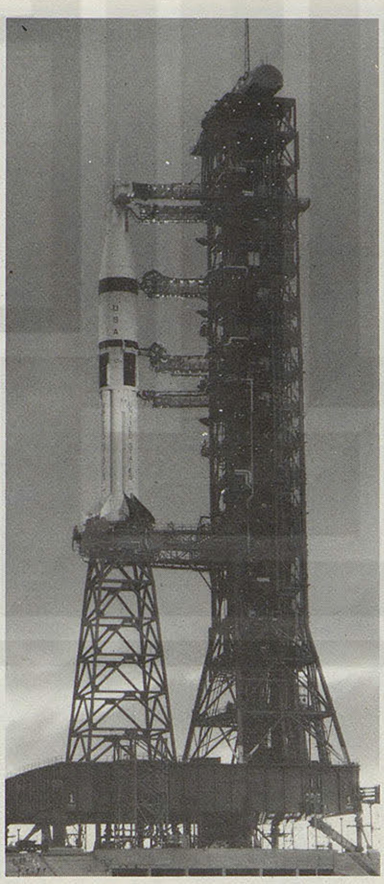
The Saturn family of heavy launch vehicles, developed by NASA expressly for manned space exploration, evolved from technology acquired during the Army's early Redstone, Jupiter, and Juno missile development programs.

The Titan/Centaur combines Titan III, the Air Force's most powerful launch vehicle, with the NASA-developed Centaur upper stage.

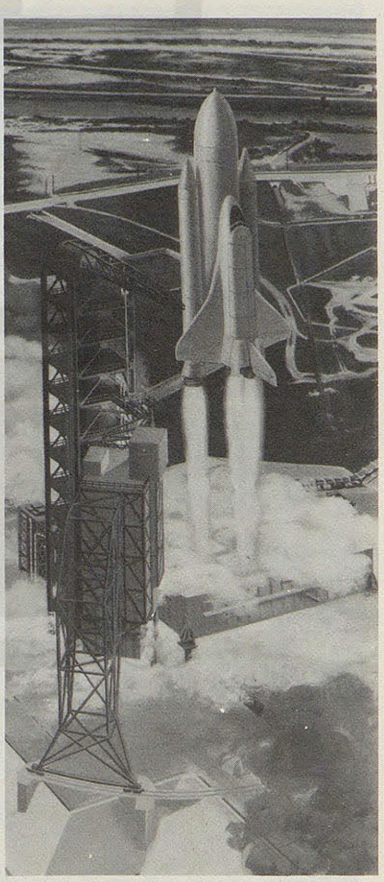
An all-new space vehicle, the Space Shuttle, is being developed by NASA to carry useful cargo to and from Earth orbit. After the Shuttle becomes operational in the early 1980's, the requirement for expendable rockets will be virtually eliminated since the Shuttle will have the versatility to carry out a wide range of missions. Details on the Shuttle and its capabilities are described in another section of this brochure.



Skylab I/Saturn V launch



Skylab II/Saturn IB on pad



Artist's concept, Space Shuttle launch

MANNED SPACE FLIGHT

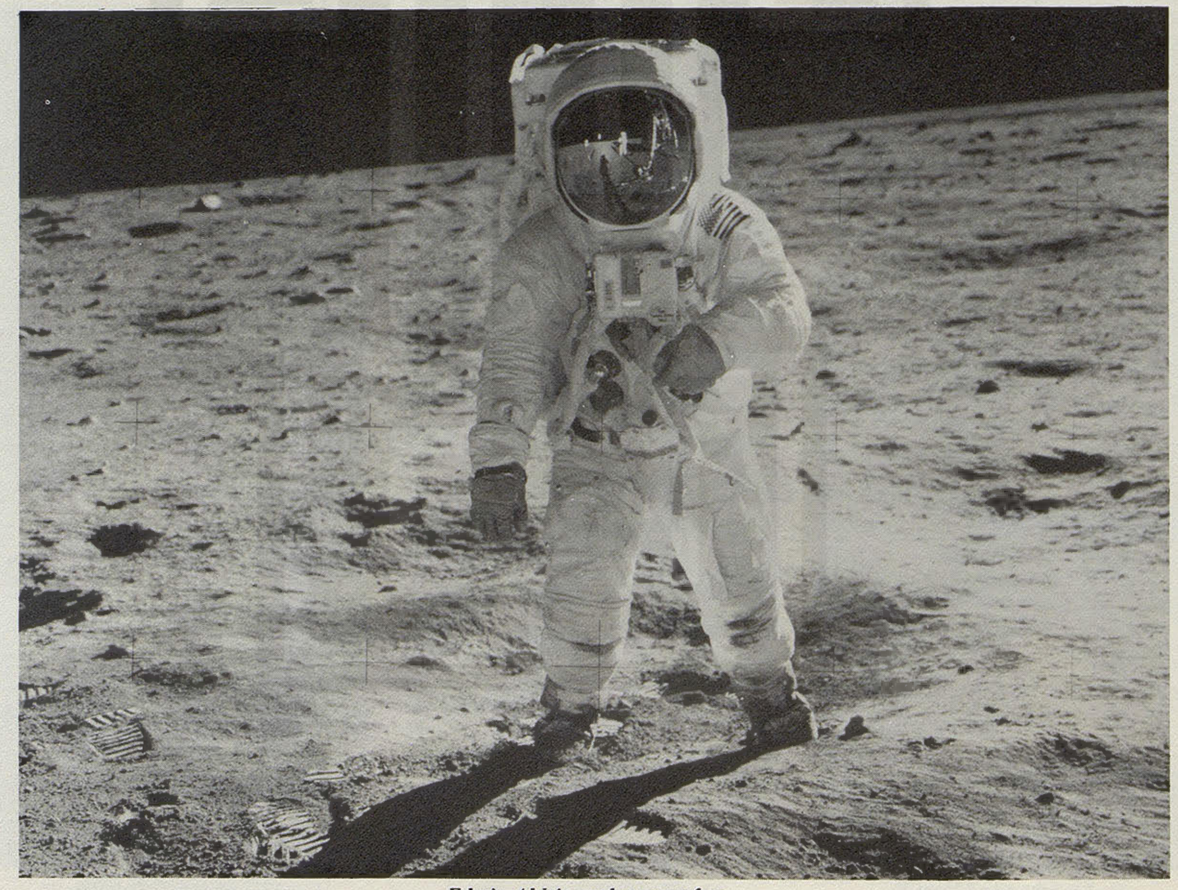
For thousands of years man has dreamed of the day when he would explore the vast universe that surrounds his tiny planet. This aspiration has stemmed not only from his curiosity but also from his fundamental thirst for knowledge and his readiness to accept a challenge.

When Orville Wright made the first powered airplane flight in 1903 at a speed of 31 mph, the significance of his achievement was barely recognized. Yet in little more than half a century following that historic event at Kitty Hawk, man has succeeded in orbiting the Earth at speeds measured in thousands of miles per hour and has set foot on the Moon as the first stop on the way to manned exploration of the solar system and the infinite reaches of interstellar space beyond.

The achievements in space since the first satellites were launched pale in significance when compared with future projects. Only in the light of what has already been accomplished can man look ahead with the almost certain knowledge that he eventually will realize his age-old dream of exploring the universe.

Viewed in terms of time and distance, the challenge of space exploration seems insurmountable. Yet, a review of the technological accomplishments of the 20th century indicates that what appears as "impossible" is merely "difficult."

The exploration of space is following the pattern by which flight within the atmosphere was mastered — each new development provides a platform from which to take the next step and each step



Edwin Aldrin on lunar surface

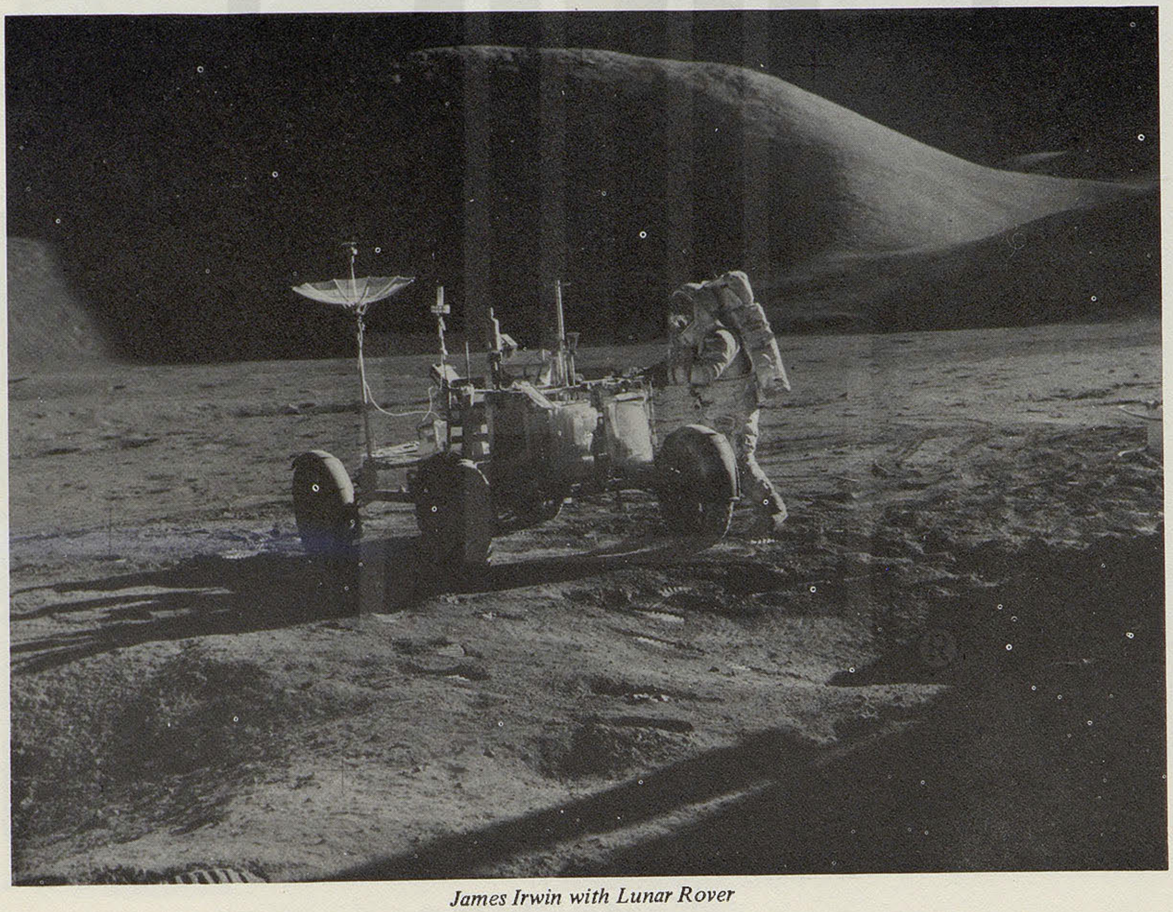
adds an increment of scientific knowledge and technological skill.

Man has visited the Moon. Someday he may visit Venus, Mars, other planets and perhaps discover life elsewhere in the universe. He may communicate one day with other beings. Benefits for all mankind will result from continued space exploration.

If the history of scientific exploration in the past can serve as a valid guideline to the future, the knowledge to be gained from future manned ventures into space will far exceed the most optimistic hopes and dreams.

Although the landing of American astronauts on the Moon was set as a major national goal, the three projects directed toward achieving this aim — Mercury, Gemini and Apollo — were designed to lay the foundation for additional progress.

Project Mercury, the initial step in the United States' manned space flight program, was completed on May 16, 1963, after six successful manned missions. The Gemini program involving two-man spacecraft, was completed on November 15, 1966, following ten Earth-orbital missions. The knowledge and skills acquired in both programs were utilized in the Apollo and Skylab programs and then the Apollo Soyuz Test Project. This wealth of experience is now being supplied to the development of the Space Shuttle, the manned vehicle which will permit routine operations in space.



James Irwin with Lunar Rover

MERCURY AND GEMINI

Project Mercury, the first U.S. manned space flight program, was organized October 5, 1958, and successfully executed in less than five years. The program laid a sound foundation for the technology of manned space flight.

The primary objectives of Project Mercury were:

> To place a manned spacecraft in orbital flight around the Earth
>
> To investigate man's performance capabilities in a weightless environment and his ability to function in space
>
> To recover safely both man and spacecraft

The Mercury spacecraft, a one-man, bell-shaped vehicle, 9.5 feet high and 6 feet across at its reentry heat shield base, weighed approximately 4,000 pounds at liftoff and 2,400 pounds at recovery.

The launch vehicle for the Mercury suborbital missions was a modified Redstone rocket generating 78,000 pounds of thrust at liftoff. A modified Atlas rocket whose three engines produced 367,000 pounds of thrust was employed for Mercury orbital flights. Complexes 5/6 and 14 at Cape Canaveral were utilized for the Mercury missions.

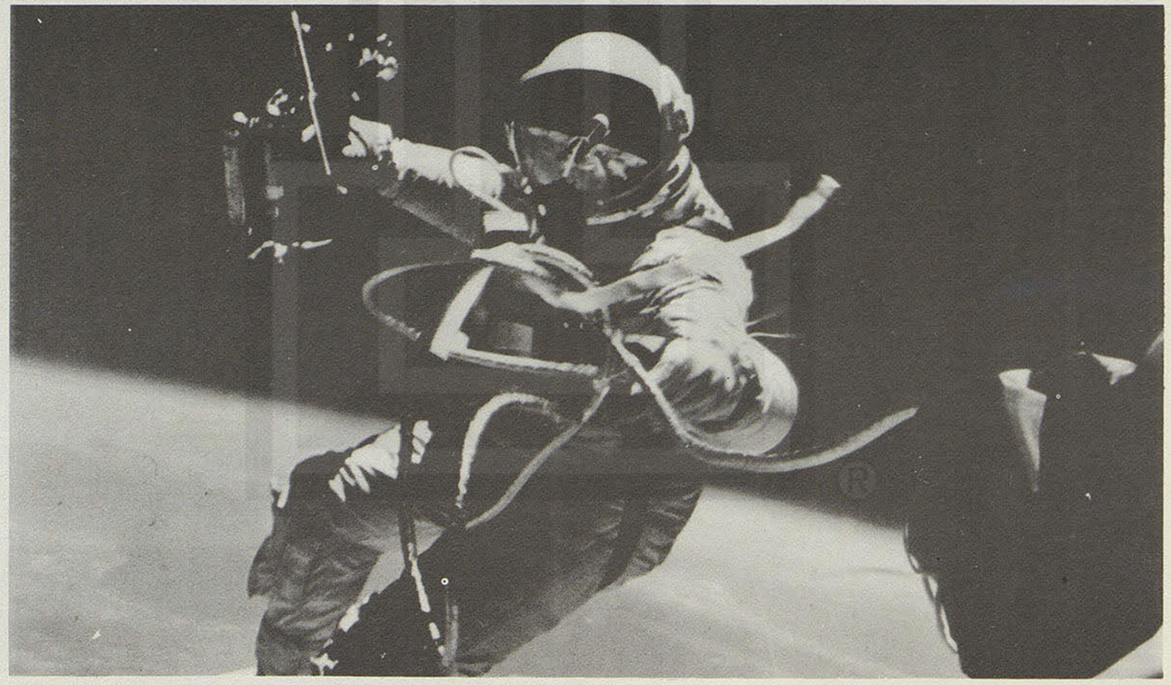
Gemini was the intermediate step toward achieving a manned lunar landing, bridging the flight experience gap between the short duration Mercury flights and the long duration missions of Apollo.

Major objectives achieved during the Gemini program include demonstration that man can perform effectively during extended periods in space, both within and outside the protective environment of a spacecraft, development of rendezvous and docking techniques, and perfection of controlled reentry and landing procedures.

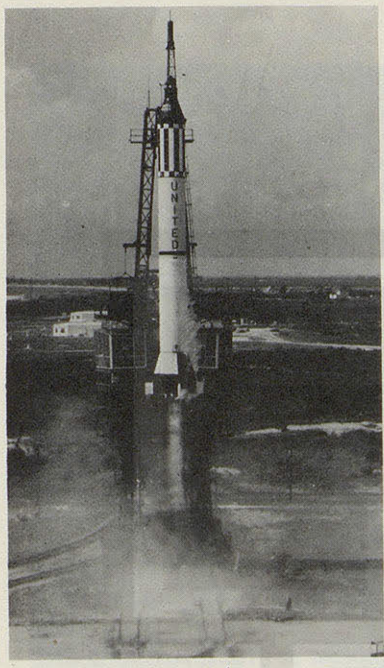
The Gemini program provided the first American demonstration of orbital rendezvous and docking — a critical maneuver for a manned lunar landing.

The two-man Gemini spacecraft was also a bell-shaped vehicle; however, it was almost twice as heavy, was 20 percent larger and contained 50 percent more volume than the Mercury spacecraft.

The launch vehicle employed in the Gemini program was the modified Air Force Titan-II rocket which developed a thrust of 430,000 pounds at liftoff. The overall length of the Gemini-Titan II space vehicle was 109 feet. Gemini flights were launched from Complex 19 at Cape Canaveral.

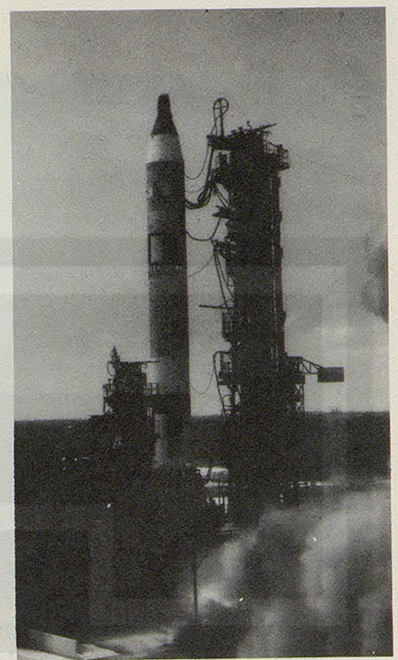


First U.S. space walk (1965)

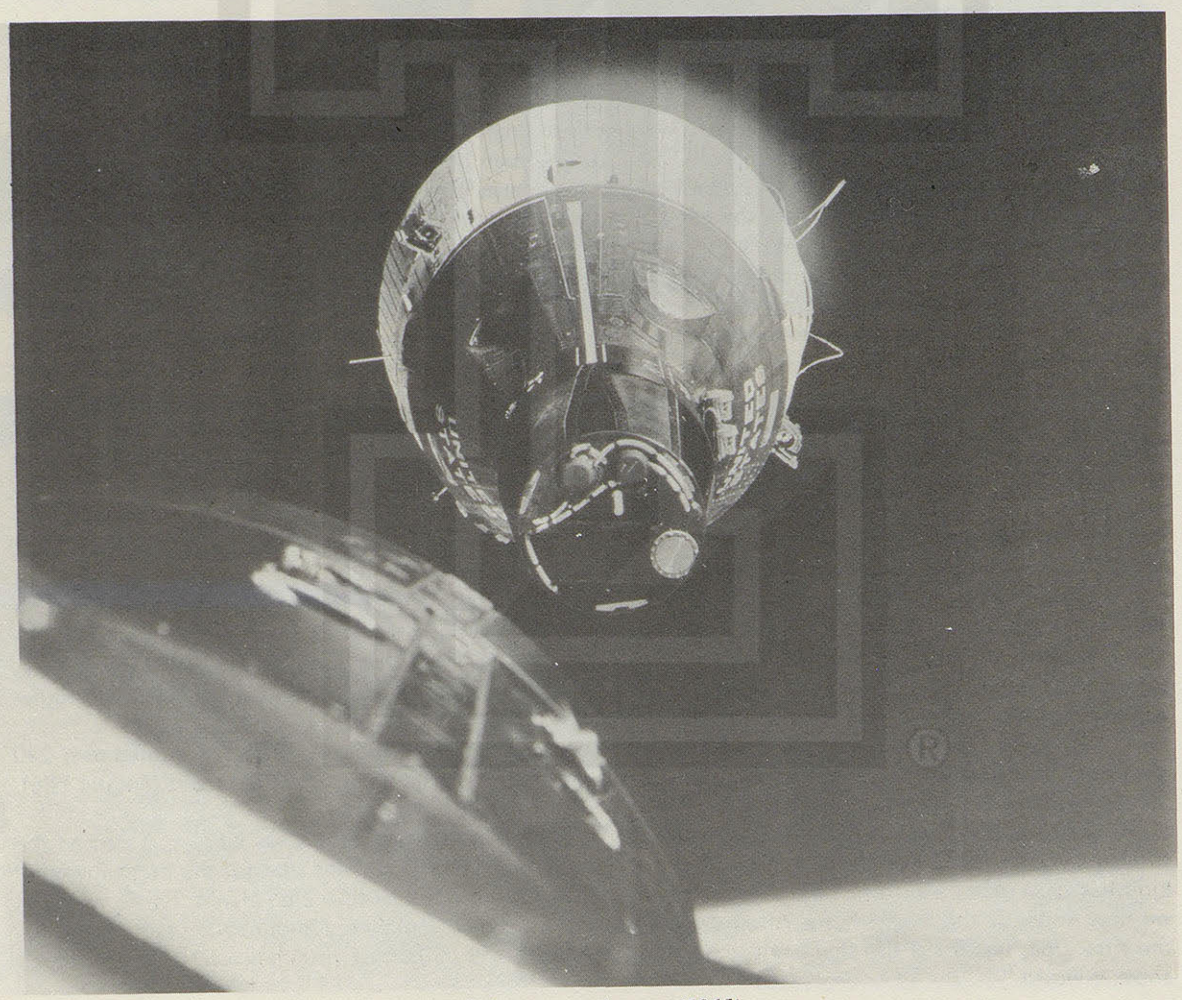


First manned Mercury/Redstone launch

Mercury/Atlas launch



Gemini-Titan launch



First U.S. space rendevzous (1965)

APOLLO

Apollo, the largest and most complex of the manned space flight programs, had as its goal the landing of astronauts on the Moon and their safe return to Earth. The goal was achieved in July 1969, when Apollo 11 astronauts successfully executed history's first lunar landing. Commander Neil A. Armstrong and Lunar Module Pilot Edwin E. Aldrin landed on the surface as Command Module Pilot Michael Collins orbited the Moon.

The astronauts traveled to the Moon in the three-man Apollo spacecraft. Weighing 45 tons, the spacecraft consisted of three sections — a Command Module, a Service Module and a Lunar Module.

Providing the muscle for the Apollo program was the Saturn family of heavy launch vehicles. Developing 1.5 million pounds of thrust at liftoff, Saturn I demonstrated the feasibility of clustered rocket boosters and verified operation of the vehicle guidance and control system.

Saturn I was succeeded by Saturn IB, rated at 1.6 million pounds of thrust at liftoff. Apollo Command and Service Modules and a Lunar Module were launched by Saturn IB rockets on unmanned flight tests preceding Apollo 7, which carried astronauts Walter M. Schirra, Don F. Eisele and Walter Cunningham on a ten-day Earth-orbital mission.

Manned lunar missions used Saturn V launch vehicles to boost Apollos into space. The Apollo/Saturn V space vehicle was 363 feet tall, weighed over 6 million pounds and developed 7.7 million pounds of thrust at liftoff.

The manned Apollo/Saturn V missions were outstandingly successful. Apollo 8 with astronauts Frank Borman, James A. Lovell and William A. Anders, carried men on their first orbit of the Moon. Apollo 9 marked the first manned flight of the Lunar Module. Astronauts James McDivitt and Russell L. Schweickart in the Lunar Module separated from the combined Command Service Module, manned by David R. Scott, to rendezvous and dock with it. With the Apollo 10 mission in May 1969, all of the complicated lunar orbital maneuvers (except for landing), were successfully performed by astronauts Thomas P. Stafford, John W. Young and Eugene A. Cernan.

Apollo 12 touched down on the Moon near the unmanned Surveyor III which had soft-landed on the lunar surface in 1967. The crew of Charles Conrad, Richard F. Gordon and Alan L. Bean returned rock samples and Surveyor III parts.

The Apollo 13 mission was aborted after an explosion occurred in the Service Module en route to the Moon. The Lunar Module's descent engine was used to maneuver the spacecraft around the Moon and safely back to Earth. Crew members were James A. Lovell, John L. Swigert and Fred W. Haise.

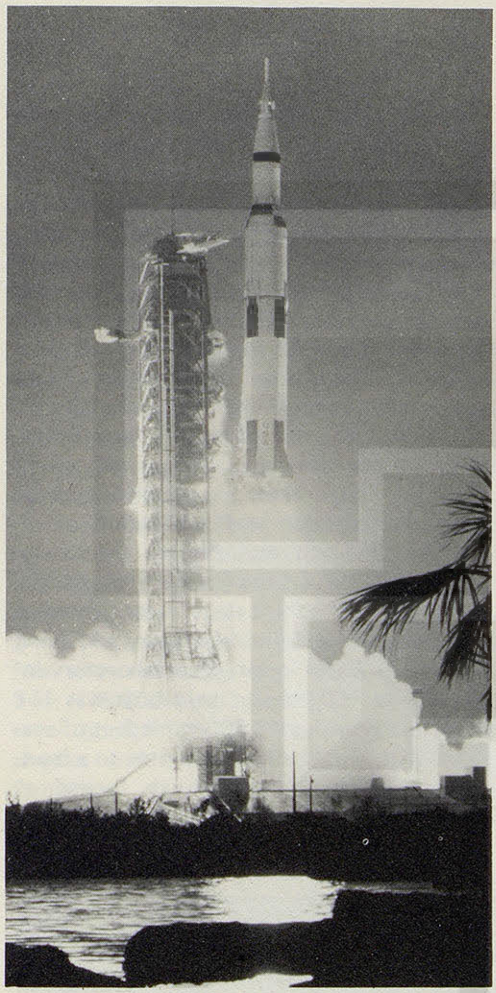
Alan B. Shepard, the first American in space, commanded Apollo 14, which carried a two-wheel cart that was used to move equipment and samples on the Moon. Stuart A. Roosa was Command Module Pilot and Edgar D. Mitchell, Lunar Module Pilot.

Apollo 15 commanded by David R. Scott, marked the first use of a battery-powered Lunar Roving Vehicle on the Moon. Alfred M. Worden was Command Module Pilot, James B. Irwin, Lunar Module Pilot.

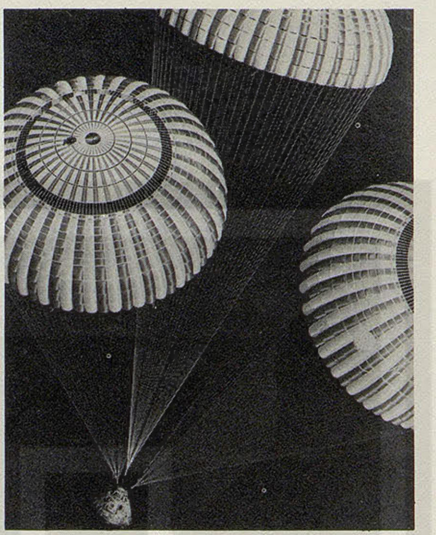
Apollo 16, launched April 16, 1972, was commanded by John W. Young. Thomas K. Mattingly was Command Module Pilot, Charles M. Duke, Lunar Module Pilot. The mission included three extravehicular activity periods on the Moon.

Apollo 17, last mission in the Apollo Program, was launched December 7, 1972. It returned over 240 pounds of lunar material. Eugene A. Cernan was Commander, Ronald W. Evans, Command Module Pilot, and Harrison H. Schmitt, Lunar Module Pilot.

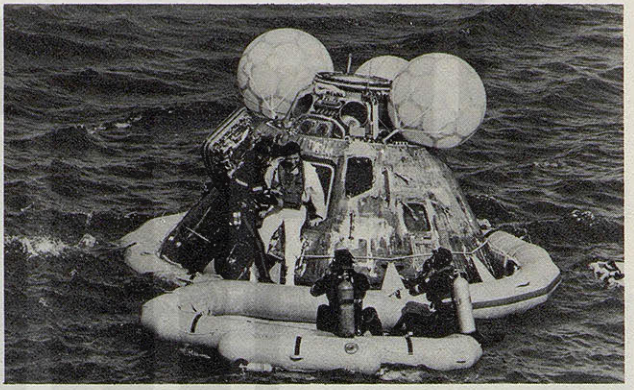
Dr. Thomas Paine, NASA Administrator when Apollo 11 made the first lunar landing, noted on the fifth anniversary of the mission: "The fundamental significance of Apollo was that for the first time mankind has been given a vision of the thin biosphere that surrounds our beautiful blue planet, Earth, which as we now know, is the fragile home of all the life that so far has been detected in our solar system. And for the first time, terrestrial life that evolved here on this planet over billions of years has reached out to touch another world."



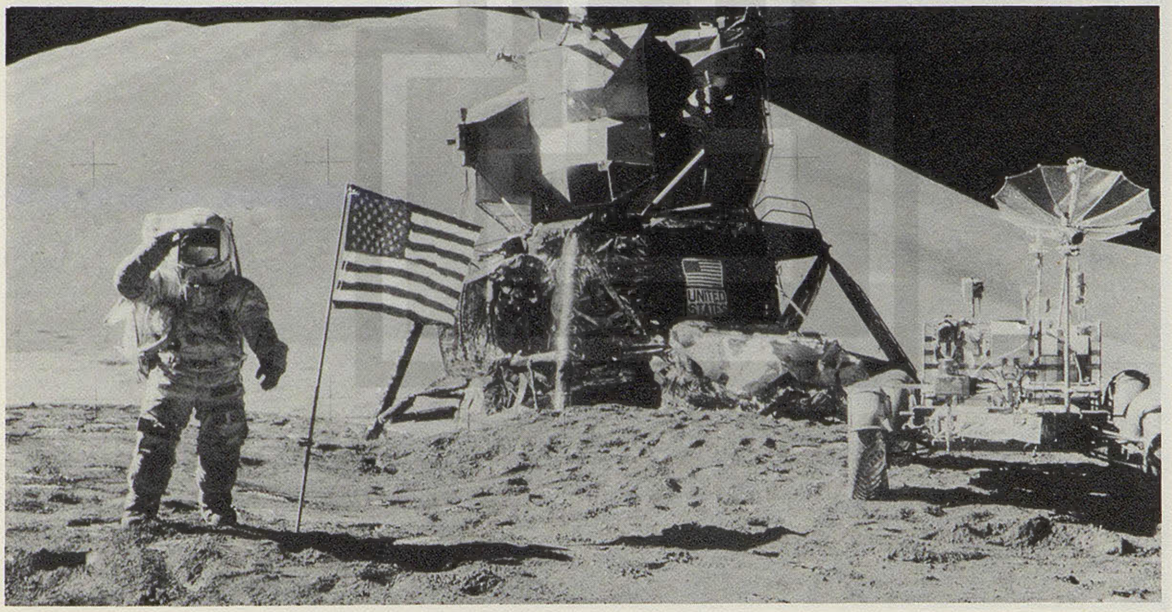
Apollo 14 liftoff



Apollo 17 prior to splashdown



Harrison Schmitt exits Apollo 17



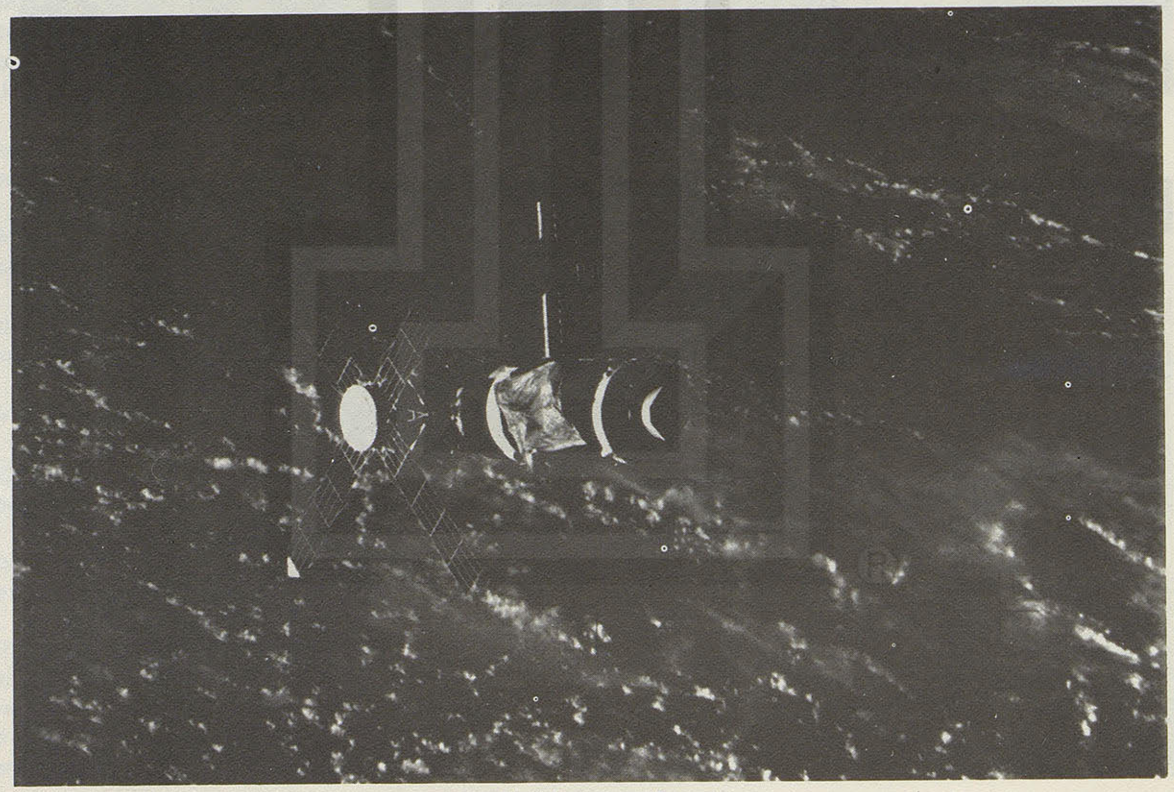
James Irwin on lunar surface

SKYLAB

Skylab was the NASA experimental space station program which became operational in 1973. An extension of the Mercury, Gemini and Apollo programs, Skylab used much of the hardware and technology developed for previous manned missions.

This program was designed to expand our knowledge of manned Earth-orbital operations and to conduct over 50 scientific, technological and medical experiments. Included were high-resolution astronomical studies of the Sun at short wave lengths not observable from Earth, medical research associated with man's living and working in space for extended periods of time and investigation and application of remote sensing of Earth resources.

Skylab I utilized the first two stages of a Saturn V to boost a third stage, reconfigured as a space station to provide laboratory and living quarters, into Earth orbit. The laboratory-in-space weighed 100 tons at launch. It was 117 feet long and provided 12,000 cubic feet of useful space within its shell. Comparable to a modest three-bedroom home, Skylab carried at launch 2,100 pounds of food, 6,000 pounds of



Skylab space station

water, nitrogen, oxygen and other life-sustaining essentials for the three crews.

Skylab orbited Earth once every 93 minutes at an altitude of 268 statute miles. The orbital trajectories swept an area covering 75 percent of Earth's surface, 80 percent of its food-producing regions and 90 percent of its population.

Saturn IB boosters orbited three crews in Apollo spacecraft to rendezvous and dock with the space station and occupy it to conduct experiments. The first crew remained in the station 28 days, the second crew 59 days and third crew 84 days.

All told, the three crews completed 2,476 revolutions around Earth and traveled some 70,500,000 miles during a total of over 171 days in space.

The crews spent 740 hours observing the Sun with telescopes and brought home more than 175,000 solar pictures. Such data could revolutionize long-standing theories of solar physics and could lead to utilization of the Sun's vast energy for practical use on Earth.

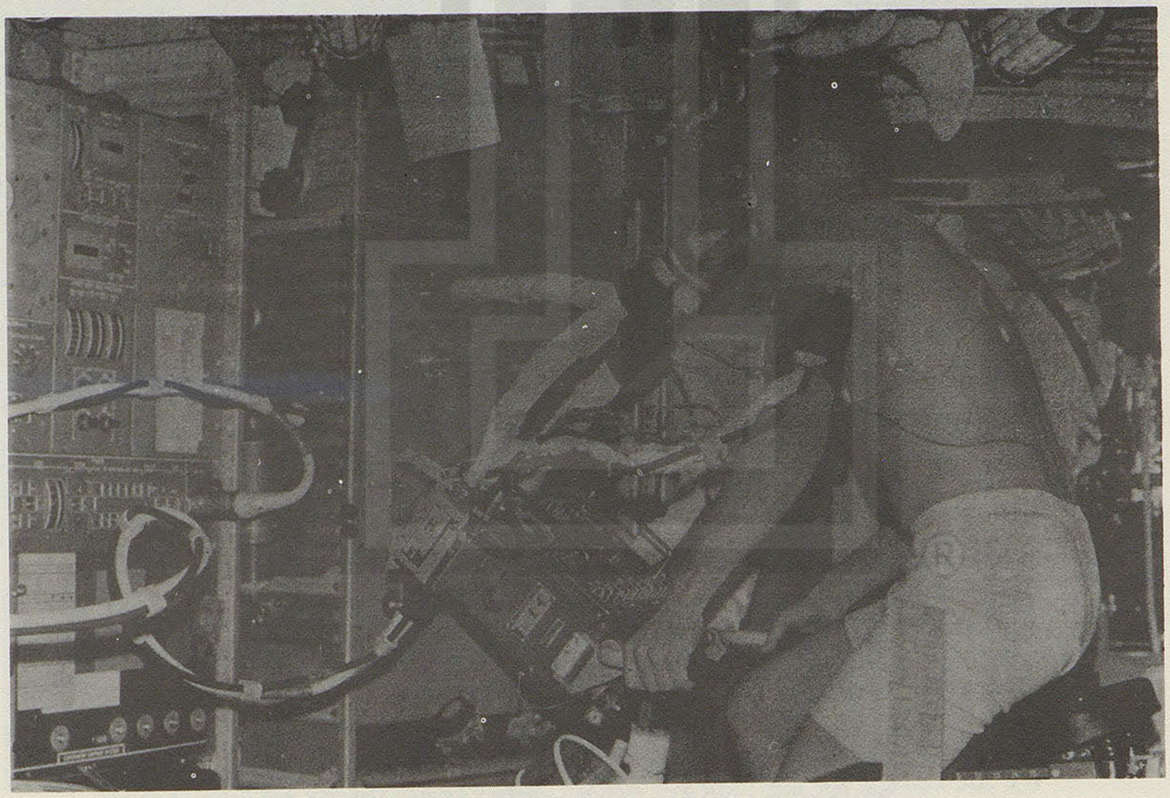
Over 46,000 photographs and 40 miles of electronic data tape obtained by Skylab's Earth resources instruments and cameras already are being used by government and industry for studies ranging from agriculture to zoology.

Skylab biomedical findings indicated man adapts well and can function effectively in space for a period of almost three months, provided he has a proper diet and adequately programmed exercise, sleep, work and recreation periods.

Dr. James Fletcher, former NASA Administrator, stated at the completion of the third and final manned Skylab mission:

"Each of these great vehicles has carried us beyond the contemporary limits of human knowledge into a new comprehension of our possibilities and a new definition of our destiny. Everything we have done in the Skylab program has been necessary for future progress in space.

"Skylab has moved the space program from the spectacular into a new phase. It has contributed to an orderly transition from the Apollo era to the Space Shuttle and Spacelab era."



Paul Weitz exercises aboard Skylab

APOLLO SOYUZ TEST PROJECT (ASTP)

The Apollo Soyuz Test Project was a cooperative United States-Russian mission to test compatible rendezvous, docking and crew transfer systems in space using Apollo and Soyuz spacecraft. Other goals were the performance of space experiments, five of which were accomplished jointly by the three astronauts and two cosmonauts, and development of experience for the conduct of possible future joint missions.

In preparation for the flight, the U.S. prime and backup crews spent three weeks at

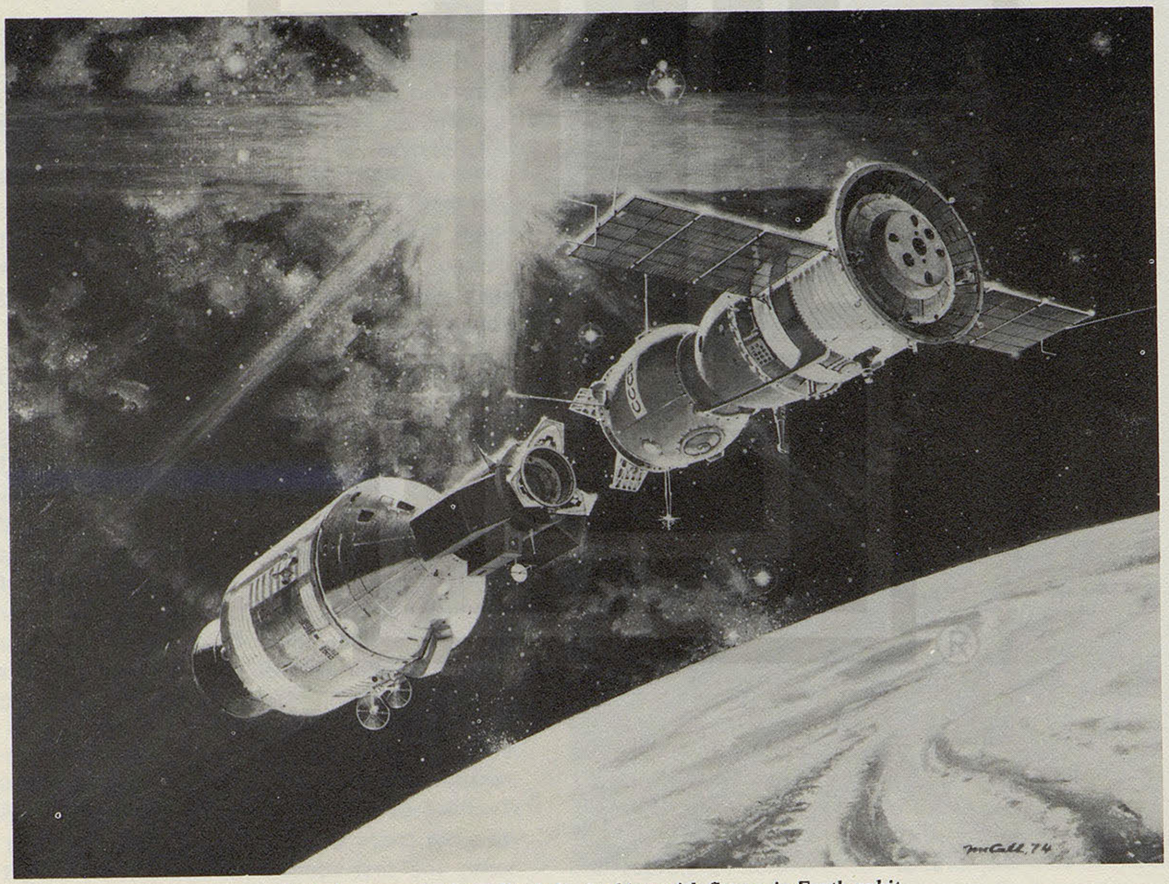
U.S. crew members, left, with USSR crew members, Aleksey Leonov, standing, and Valeriy Kubasov the Soviet space center training in simulators and conducting communications tests. They also visited the USSR launch site. In turn, the Russian cosmonauts spent three weeks in similar training at the Johnson Space Center, Texas, and visited the launch site at the Kennedy Space Center. Joint U.S./USSR working groups met on a scheduled basis to work out technical and operational aspects of the project. Specialists of the two nations exchanged visits to participate in preparation of the spacecraft.

The mission plan was followed closely. Soyuz was launched first from the Baykonur launch complex in the USSR on July 15, 1975. Apollo was launched seven and one-half hours later by a Saturn IB from Launch Complex 39.

Apollo rendezvoused and docked with Soyuz on July 17. During two days of docked operations in Earth orbit, the two crews visited each others' spacecraft in four different transfers through the docking module. The spacecraft separated for the final time July 19. On July 21, Soyuz deorbited and landed in the Soviet recovery area. Apollo splashed down July 24 some 300 miles west of Hawaii.

Thomas P. Stafford was Commander of the Apollo Crew. Vance D. Brand was Command Module Pilot and Donald K. Slayton was Docking Module Pilot.

Soviet crew members were Commander Aleksey Leonov and Flight Engineer Valeriy Kubasov.



Artist's concept of Apollo, left, docking with Soyuz in Earth orbit

EXPENDABLE VEHICLE OPERATIONS

Unmanned spacecraft continue to make important contributions in man's quest for knowledge about the world in which he lives and the universe around him. Much of this knowledge is directly attributable to the growing family of satellites and space probes launched by Expendable Vehicles for scientific and applications objectives.

Explorer satellites have mapped the Earth's magnetic field and have pioneered in gaining new knowledge of the Earth's shape and mass distribution. Explorer I, this country's first satellite which was launched from Cape Canaveral on January 31, 1958, discovered that the Earth is surrounded by a region of deadly radiation, subsequently named the Van Allen Radiation Belt. Other satellites have furnished information on micrometeoroids, temperatures in space, radiation and magnetic fields, upper atmospheric conditions, solar activity and other phenomena.

Meteorological spacecraft have achieved the most significant advances in weather forecasting since the invention of the barometer over three centuries ago. Tiros satellites, the first orbiting "weathermen," were launched by Delta vehicles from Cape Canaveral's Complex 17 beginning in April 1960, and returned well over a million cloud-cover photographs. Since then, improved polar orbiting meteorological satellites, augmented by stationary satellites above the Equator, operate in conjunction with a worldwide system of receiving stations to provide daily data on weather conditions over the entire globe. Fast, accurate weather reporting coupled with long-range weather prediction can be worth untold millions of dollars to agriculture, business and industry. Ultimately, such a system may lead to control of the world's weather.

Communications spacecraft such as experimental Echo, Telstar, Relay, Syncom and Early Bird satellites and present-day Intelsats have shrunk the distance between continents. Now the United States, Canada, Great Britian, France and Indonesia have domestic communications satellites.

Exploration of the Moon's surface and environment by unmanned space probes was essential to obtain data for the manned lunar landings. This informtion is important also to geologists and astronomers who will use that and Apollo data to study the Moon for years for clues as to its origin.

Rangers 7, 8, and 9 returned thousands of close-up pictures of the Moon's surface. On June 2, 1966, the Surveyor 1 spacecraft, the first in a successful series, soft-landed on the Moon. Surveyor 1 and later Surveyors transmitted thousands of detailed photographs of the lunar surface and sampled soil, providing information vital to the American manned lunar landings.

Investigations of planets and interplanetary space are conducted by unmanned spacecraft such as Mariner, Pioneer, Viking and Voyager.

Mariner and Pioneer spacecraft launched in 1974 flew by three planets — Venus, Mercury and Jupiter — on missions that produced tremendous increases in our knowledge of the solar system.

Mariner 10, after photographing Venus and returning other data, flew by Mercury three times. The mission provided man with his first close-up look at this tiny planet, closest to the Sun, and returned excellent photographs and data.

Pioneer 11 swept past Jupiter in December 1974, three times closer than Pioneer 10 which in 1973 had provided new information about the solar system's largest planet. Using the strong pull of Jupiter's gravity, Pioneer 11 (renamed Pioneer Saturn) set off on a new course that will take it close to the ringed planet Saturn in 1979. Pioneer 10 is now on a trajectory that will take it across the orbits of Uranus, Neptune and Pluto to enter another planetary system, the first man-made object to leave our solar system. The spacecraft carries a plaque that will identify it if it is discovered by inhabitants of another planetary system.

The most powerful and versatile communications satellite ever developed, Applications Technology Satellite-6 was launched in 1974 into stationary Earth orbit. It beamed by color video the first educational course ever taught via satellite. Later, the satellite was moved in orbit to a point over East Africa. From here it transmitted instructional programs for a year to persons watching low-cost television sets in some 5,000 remote communities in India. In 1976, ATS-6 was relocated over the Central Pacific Ocean for satellite participation in health, education and community affairs experiments.

The Titan III-Centaur rocket made its first operational flight in 1974, launching Helios-A, the first of two probes to fly closer to the Sun than any previous spacecraft.

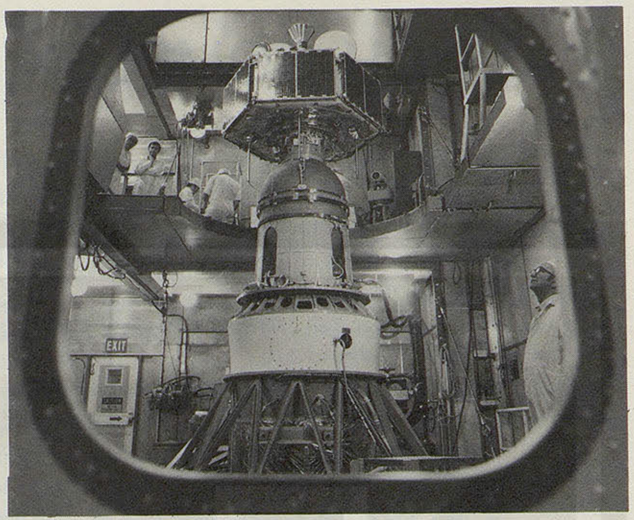
Titan III-Centaurs were also the launch vehicles for the Viking Program. Two Viking spacecraft, launched in 1975, reached Mars in mid-1976. While the Orbiters circled the Red Planet gathering and transmitting data, the Landers soft landed on the surface. The Landers, in effect combination biological and chemical laboratories, conducted scientific investigations, with special emphasis on the search for life. Data analysis will continue for several years.

Two Voyager spacecraft are scheduled for launch by Titan III - Centaurs in 1977 to conduct investigations of Jupiter and Saturn.

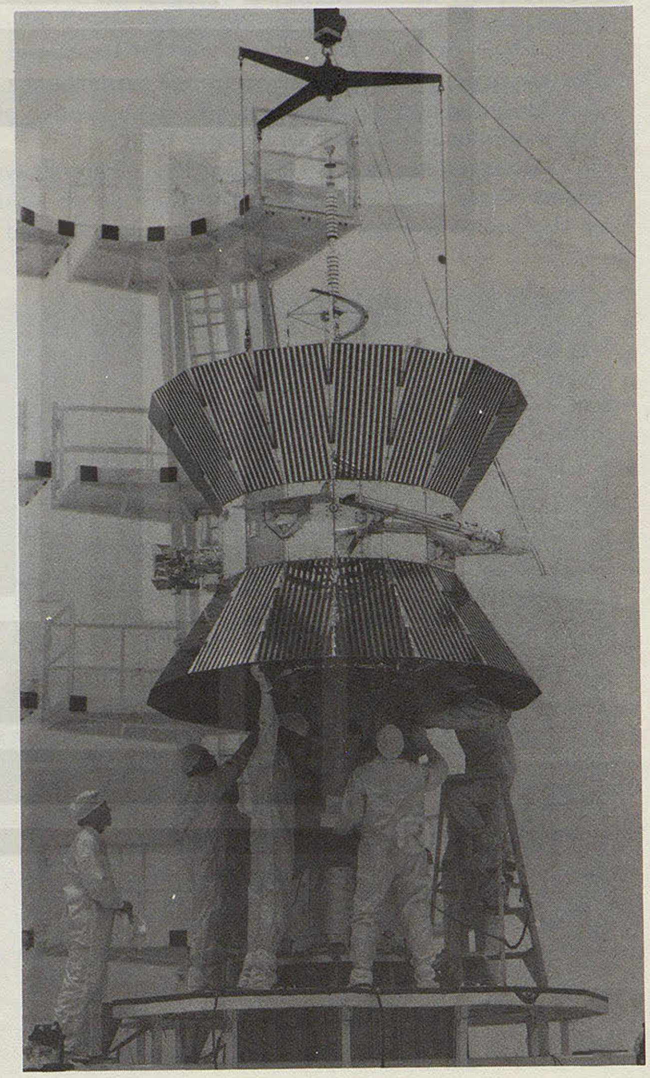
The Kennedy Space Center is also responsible for Delta launches from the Western Test Range in California. Included are Landsat spacecraft. Landsat photography is used in Earth resources investigations in 43 states and 48 foreign countries by 104 research teams. These satellites orbit Earth 14 times a day, scanning a 115-mile-wide track in four bands of the spectrum.

For the 1977-1981 period, the Kennedy Space Center has scheduled approximately 100 launches from NASA facilities at Cape Canaveral and the Western Test Range. About 75 percent will be unmanned missions; the balance will be manned Space Shuttle flights launched from Complex 39. Many of the missions will be for other Federal agencies, other governments or international agencies. For such missions, NASA is reimbursed for the cost of the launch vehicles and associated launch activities.

Goddard Space Flight Center manages NASA's unmanned scientific, meteorological, and communications satellite programs. Unmanned lunar and planetary space programs are managed by Jet Propulsion Laboratory, operated for NASA by the California Institute of Technology. Launch operations for these programs are conducted by the Kennedy Space Center.



Spacecraft being placed atop rocket



Spacecraft assembly operations

LAUNCH COMPLEX 39

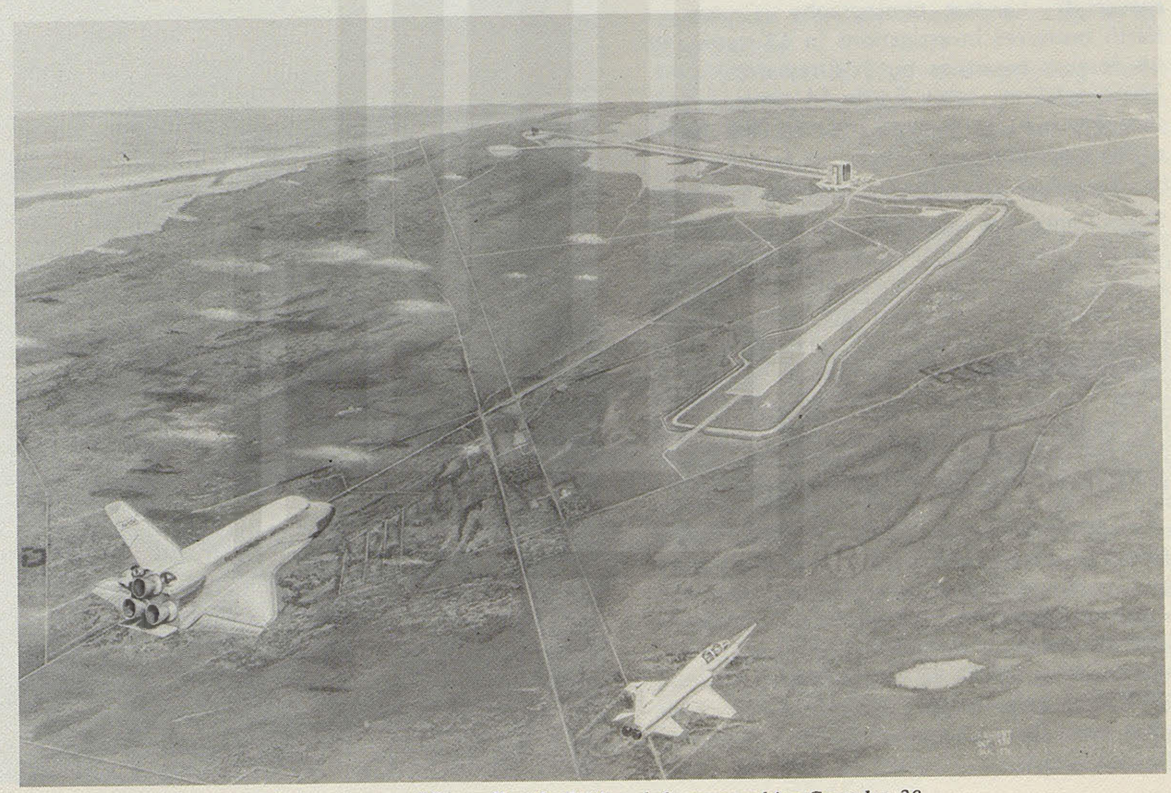
Complex 39, the facility for manned launches, is considered one of the nation's major engineering accomplishments. Launch vehicle stages and spacecraft are assembled and checked out in the protective environment of an assembly building, then moved to the launch site for final preparation and launch.

Major Components of Complex 39 for the Apollo and Skylab Programs and the Apollo Soyuz Test Project consisted of:

- a 525-foot tall Vehicle Assembly Building originally designed for assembly and checkout of Apollo/Saturns.
- a Launch Control Center with four firing rooms, three of them configured for control and monitoring of space vehicle preparation and launch operations.
- three 446-foot tall Mobile Launchers, the launch platforms upon which manned space vehicles are erected, checked out and moved to the launch pad.
- two 3,000-ton Transporters that move space vehicles on Mobile Launchers from the assembly building to the launch site.
- a Crawlerway, as wide as a turnpike, over which the Transporters move.
- a 410-foot Mobile Service Structure, moved from its parking site to the launch pad to provide access to spacecraft during final launch preparations.

These versatile facilities were used for 10 manned Apollo launches, four Skylab Program launches and the launch of the U.S. spacecraft for the Apollo Soyuz Test Project. All the major facilities are being modified for Space Shuttle operations with the exception of the Mobile Service Structure. It is scheduled to be sold as surplus and dismantled by early 1978.

Construction of a 15,000-foot long, 300-foot wide, landing runway for Shuttle Orbiters was completed in late 1976. It is located northwest of the Vehicle Assembly Building and has a tow-way similar to an airplane taxiway connecting it with that building and the Orbiter Processing Facility.



Artist's concept of Space Shuttle Orbiter, left, approaching Complex 39

INDUSTRIAL AREA

The Industrial Area of the Kennedy Space Center, NASA, nerve center of the Spaceport, is located 5 miles south of Launch Complex 39. The area was planned so that all functions not required at the launch complexes could be grouped for ease of administration and efficient operations. Here, the administrators, scientists, engineers, and technicians plan and accomplish many of the detailed operations associated with prelaunch processing and testing of space vehicles in preparation for missions.

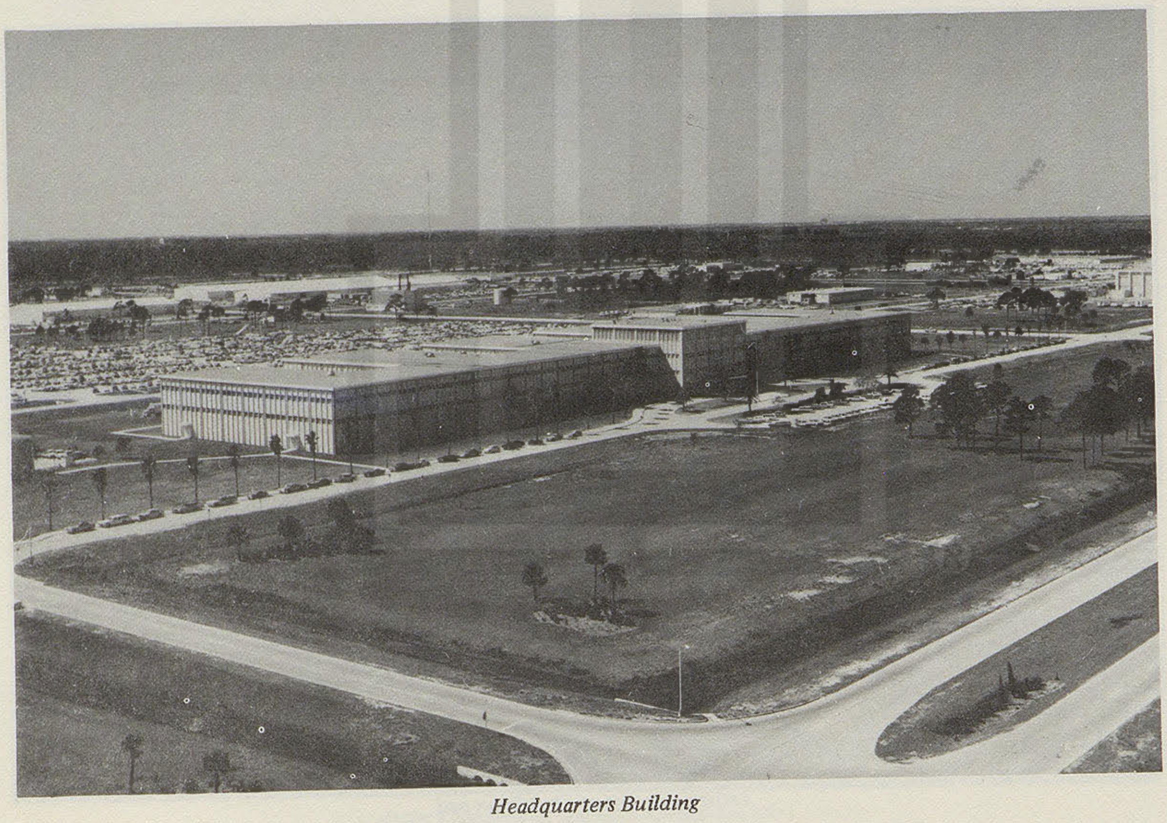
The Headquarters building is the administrative center for Spaceport operations. Here are located the Director of the Kennedy Space Center, his immediate staff members, and procurement, program management, legal, administrative and other support organizations.

The largest structure in the Industrial Area is the Operations and Checkout Building. This building was designed for a variety of functions, including the inspection, assembly, modification and non-hazardous checkout of manned spacecraft used in the Apollo and Skylab programs and the Apollo Soyuz Test Project. Two 50-foot altitude chambers were used to test spacecraft in conditions simulating altitudes up to 200,000 feet. Space-suited astronaut crews participated in these simulated flight tests. In a special section of the building, astronaut crews were quartered prior to their space missions. Engineers, scientists, technicians and specialists concerned with launch operations, technical support and other functions occupy offices in this building.

The Central Instrumentation Facility is the heart of the Spaceport's instrumentation and processing operations. It provides instrumentation to receive, monitor, process, display, and record information received from space vehicles during test, launch and flight.

The Industrial Area contains special laboratories and testing facilities for the hazardous checkout operations associated with spacecraft pyrotechnic devices and toxic fluids. Spacecraft assembly and encapsulation facilities are also located in the area.

Additional support structures include a fire station, warehouses, security offices, utility buildings and occupational health facilities.



Headquarters Building

SPACE SHUTTLE

An economical space transportation system is being developed by NASA to carry useful cargo to and from Earth orbit.

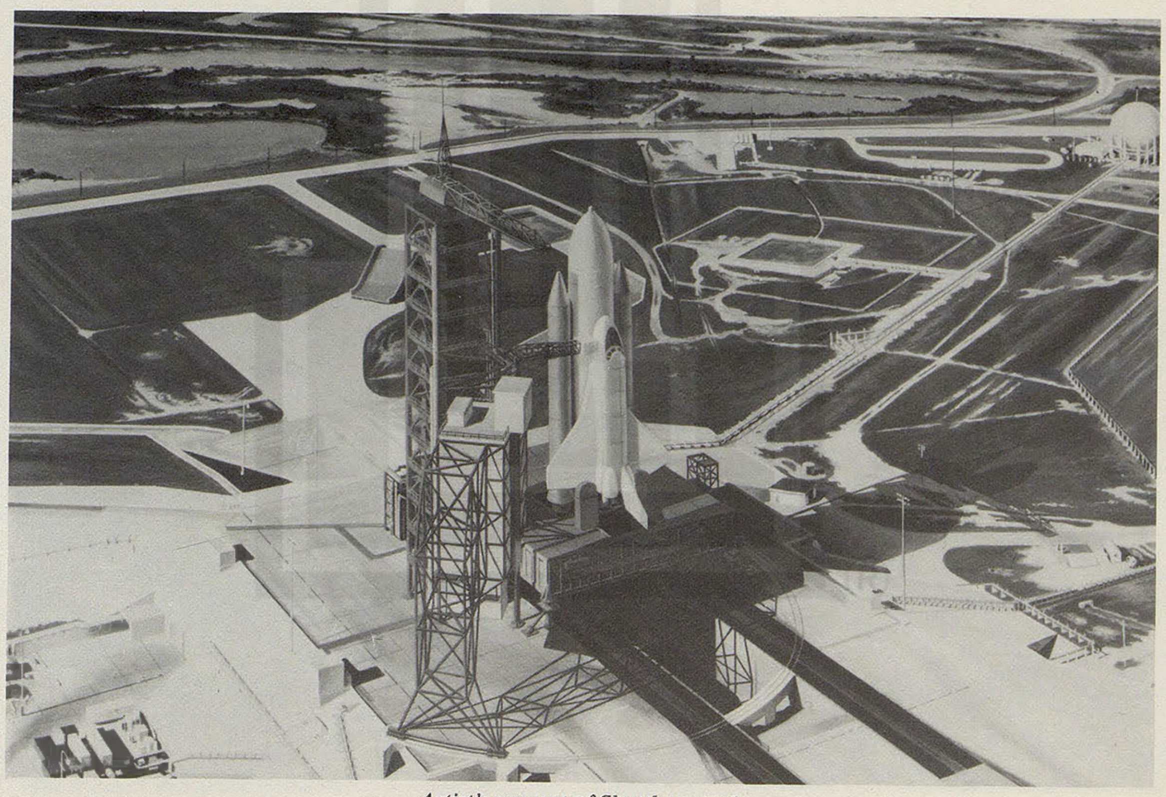
The Shuttle will consist of two stages during the launch phase of a mission. The vehicle will lift off vertically, using two solid-propellant booster rockets firing in parallel with three liquid-propelled rocket engines of the Orbiter, the airplane-like reusable stage.

After burnout, the solid rockets will be jettisoned, parachuted to the ocean and recovered for reuse. A large external propellant tank will also be jettisoned when its contents are exhausted, but it will not be recovered. The Orbiter will accelerate into orbit, carry out its mission, then reenter the atmosphere and land like an airplane.

The Orbiter, a manned vehicle combining aeronautical and space technologies, will transport men, equipment, laboratories, satellites and propulsion stages into space and later return to Earth.

OPERATIONS

Equipped with a delta wing, the Orbiter will be approximately as large as a DC-9 jet aircraft. The cargo compartment will be 15 feet in



Artist's concept of Shuttle on pad

diameter and 60 feet long. It will carry payloads of up to 65,000 pounds.

In the cockpit of the Orbiter will be a pilot, copilot and mission specialists. Each Orbiter will be designed to perform a minimum of 100 missions.

Since the maximum gravity forces experienced at launch and recovery will not exceed 3G's, any person in good health may travel to and from space in the Shuttle to carry out designated projects. Researchers will require only a few weeks of specialized training for Shuttle missions.

Manned orbital test flights are scheduled to begin from the Kennedy Space Center in 1979. Operational status is expected in 1980. West Coast operations by the U.S. Air Force from Vandenberg Air Force Base, Calif., are planned in the early 1980's.

Because of its versatility, the Shuttle is referred to as a general purpose space tranportation system. The Orbiter fuselage is being designed to handle various instruments and spacecraft and to support a variety of functions.

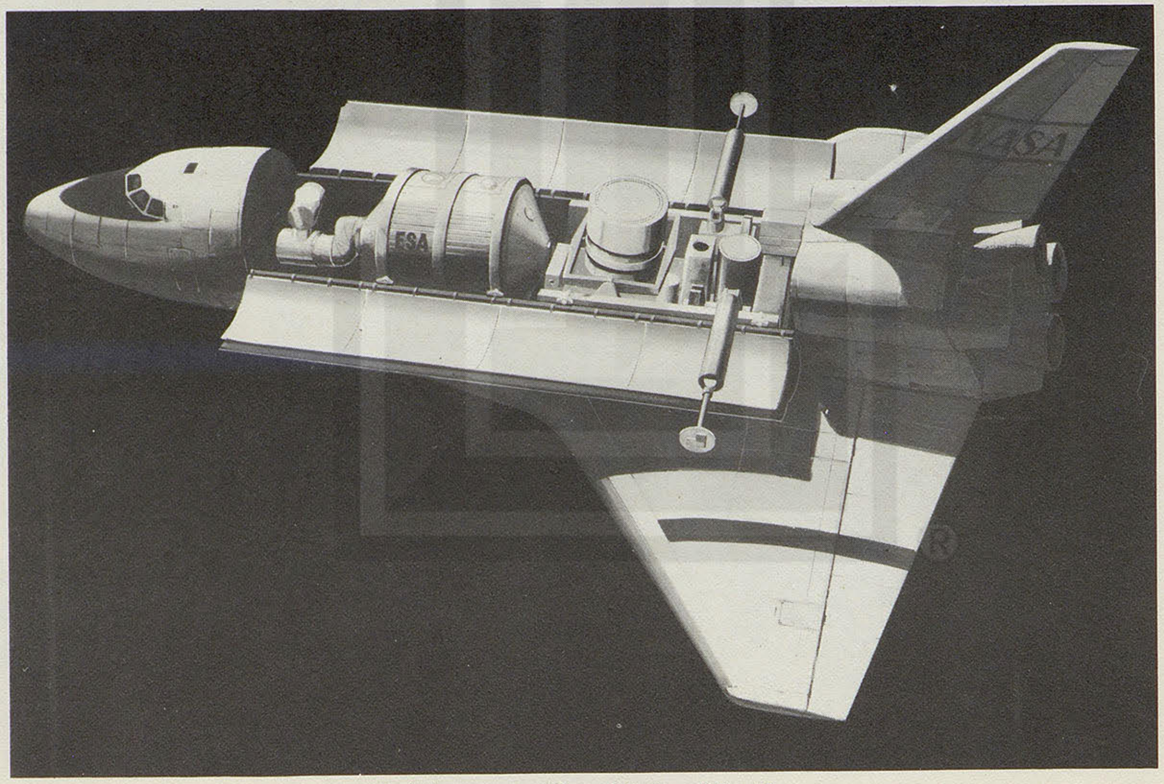
After the Shuttle is fully operational, NASA will no longer require expendable rockets such as Delta, Centaur, Titan and Saturn. The Shuttle will enable men to supervise the release and placement of satellites in orbit, or to service and repair them, or return them to Earth if necessary.

INTERNATIONAL ASPECTS

The Shuttle is expected to encourage more nations to participate in space activities since it will bring down the cost within reach of their resources. Joint experiments and enterprises will help make the benefits of space exploration and technology available to millions in the U.S. and throughout the world.

In late 1973 the United States entered into an agreement with nations in the European Space Agency (ESA) through which ESA will design, manufacture and deliver a reusable Spacelab flight unit for the Shuttle. Several Spacelab configurations will be flown. One will consist of a pressurized manned laboratory module plus an instrumented platform to support telescopes, antennas and other equipment.

NASA has agreed to procure from ESA any additional Spacelab units which later may be required for the U.S. space program. Operation of Spacelab will be a NASA responsibility.



Artist's concept of Spacelab aboard Shuttle

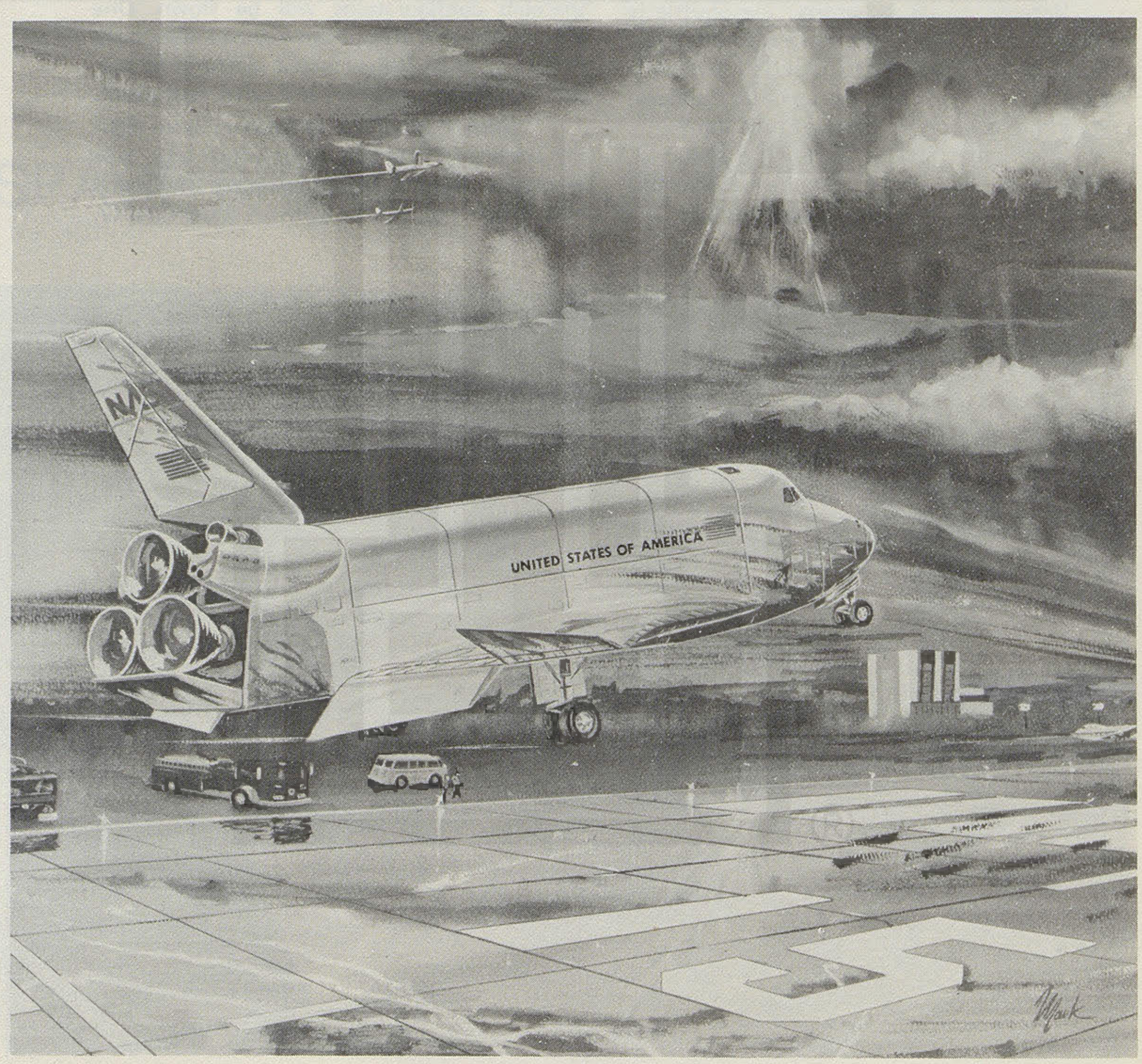
ADVANTAGES OF THE SHUTTLE

Four main reasons why the Shuttle is important to the nation's progress have been cited:

- it is needed to perform useful tasks in space
- it will make space operations much less costly and complex
- it can be developed and brought into operation by 1980 at a modest level of funding
- it will make possible wider participation in space flight and useful applications of space technology

The Space Shuttle era will begin approximately 20 years after the first U.S. venture into space, the launching of Explorer I on January 31, 1958. Since that date, unmanned spacecraft have probed the near and distant reaches of space. Men have explored the lunar surface and conducted hundreds of investigations during extended visits to the Skylab space station. The first international manned mission in space, the Apollo Soyuz Test Project, was successfully completed in 1975.

This wealth of experience is now being applied to the development of the Space Shuttle as the vehicle which will permit routine operations in space.



Artist's concept of Orbiter landing

VISITOR FACILITIES

The Kennedy Visitors Center is open to the public every day of the year except Christmas.

Available to visitors at no cost are indoor and outdoor exhibits of spacecraft and rockets, plus displays of space equipment, facilities and products. Free space movies and space science demonstrations are scheduled periodically throughout the day in two auditoriums.

Adjacent to the exhibit areas are a Gift Shop where photo supplies and souvenirs are available, the Carousel Cafeteria and free dog kennels.

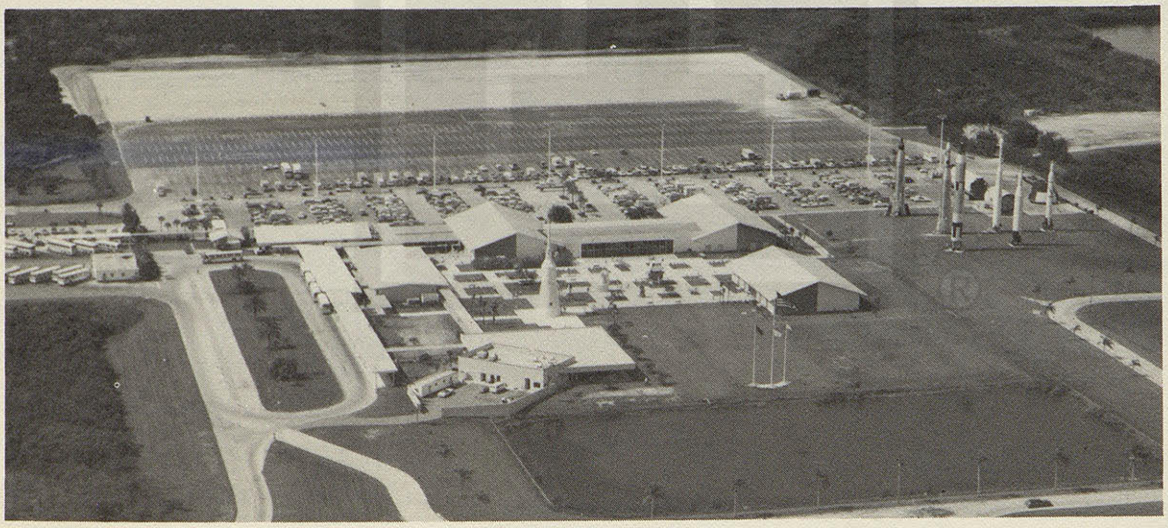
For a modest fee, visitors may elect to take a conducted bus tour to view and hear about past, present and future space facilities. The tour starts and ends at the Visitors Center. Tour buses are air conditioned and equipped with public address systems. Cameras are permitted.

Among the outdoor exhibits at the Visitors Center are Mercury/Redstone, Mercury/Atlas and Gemini/Titan II space vehicles and various rockets including a Saturn IB. Also displayed are an F-1 rocket engine and a full-scale model of a lunar module.

Indoors, you may view a one-tenth scale model of the Saturn V rocket which launched Apollo astronauts to the Moon and put the Skylab space station in Earth orbit. Also displayed are a lunar rover, astronaut space suits, a lunar rock and scale models of the Skylab space station and the Space Shuttle. Mercury, Gemini and Apollo spacecraft which flew missions and were recovered from the ocean may also be viewed.

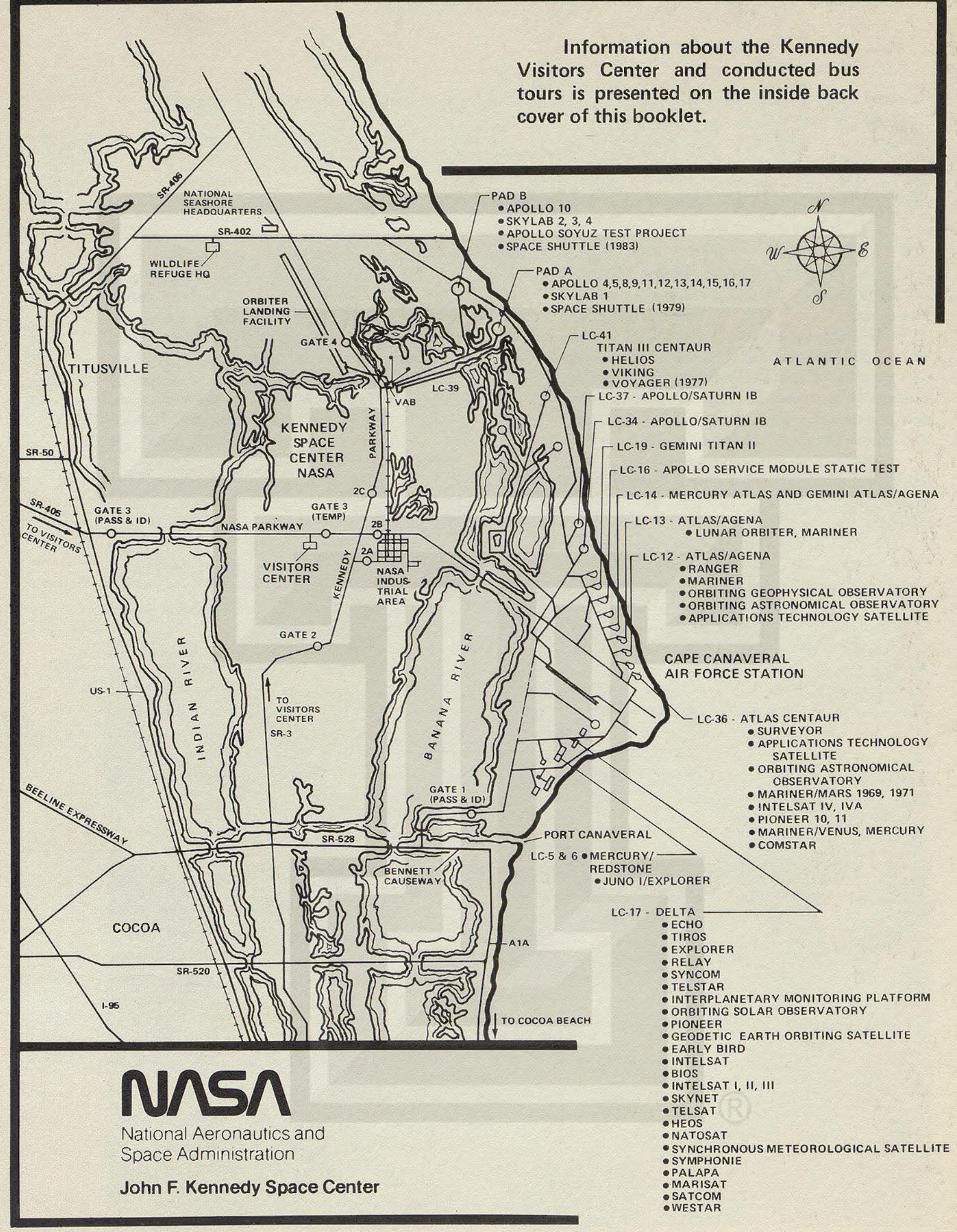
The Visitors Center may be reached from highways west and south of the Spaceport. State Road 405, which intersects U.S. 1, leads into NASA Parkway on which the Visitors Center is located. State Road 3, which intersects State Roads 520 and 528, approaches the Spaceport from the south and intersects NASA Parkway (see map on back cover).

All but the operational areas of the Spaceport are designated as a national wildlife refuge. Much of the refuge area also forms part of the Canaveral National Seashore. The refuge and seashore are open to the public during daylight hours. Refuge and seashore headquarters are about seven miles east of Titusville on State Road 402 (see map).



Aerial view of Visitors Center

Information about the Kennedy Visitors Center and conducted bus tours is presented on the inside back cover of this booklet.



NASA

National Aeronautics and Space Administration

John F. Kennedy Space Center