man in space
STUDY OF ALTERNATIVES

UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

JUNE 1987

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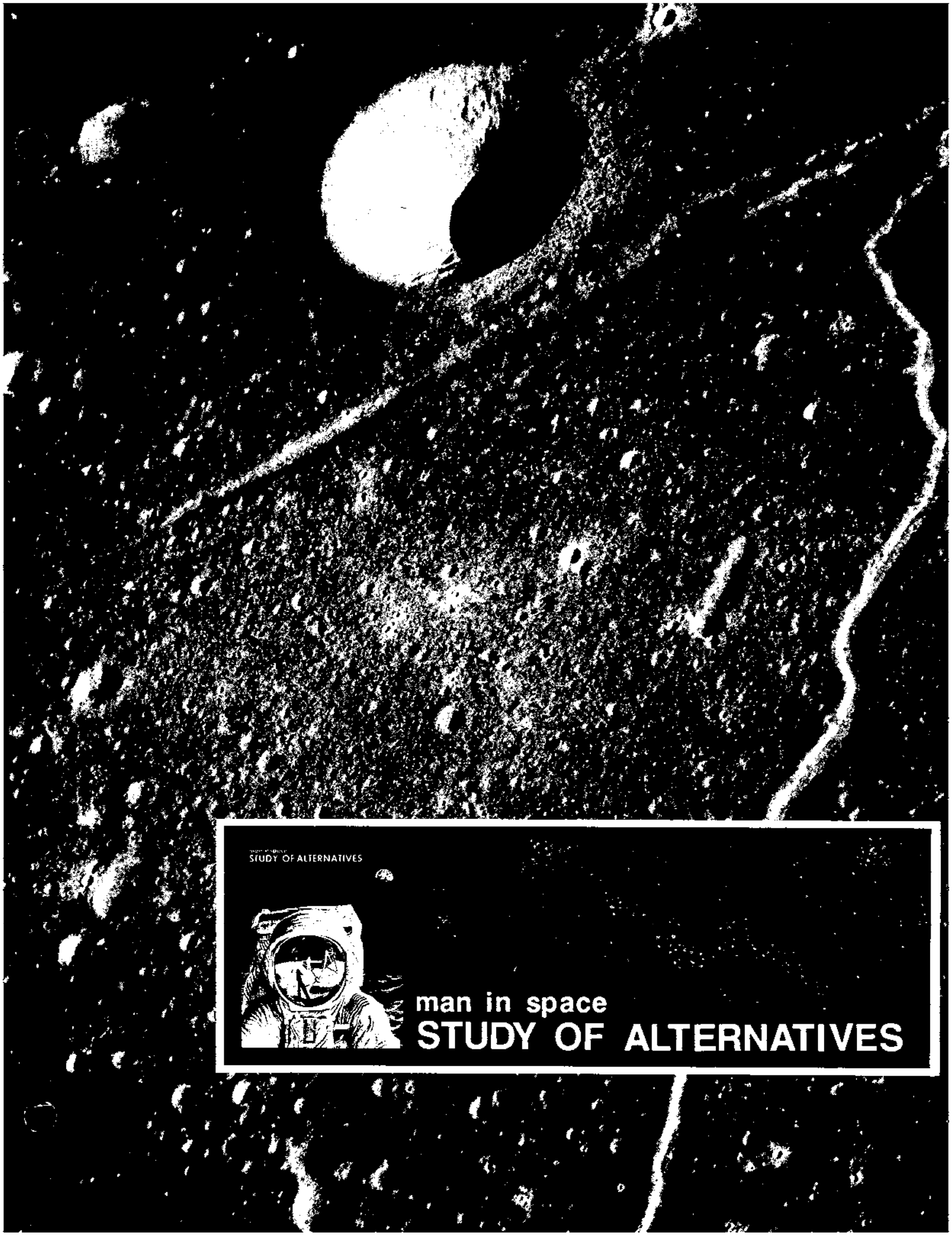
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Acknowledgments

The National Park Service wishes to express its appreciation to the personnel of the National Aeronautics and Space Administration, the U.S. Air Force, the U.S. Army, the Smithsonian Institution, the Alabama Space and Rocket Center, and other interested agencies, organizations, and individuals for providing comments and technical information that aided in the development of this study report. The Park Service extends special thanks to the field personnel at the various installations throughout the country who conducted tours of the Man in Space sites in a most professional and informative manner.

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SUMMARY

BACKGROUND AND PURPOSE

Public Law 96-344 in 1980 directed the secretary of the interior to conduct a study of locations and events associated with the historical theme of Man in Space. It also directed that the study identify possible locations, components, and features of a new unit of the national park system commemorative of this theme, with emphasis on the internationally historic event of the first human contact with the moon. This Study of Alternatives responds to the request from Congress for a report describing potential actions to safeguard from change the identified locations, components, and features and to display and interpret them for visitor appreciation.

SCOPE

In 1981 the National Park Service prepared a reconnaissance survey of the sites associated with the early American space program, and in 1984 it completed a national historic landmark theme study. These studies identified 25 national historic landmarks and one nationally significant site listed on the National Register of Historic Places that best illustrate the Man in Space theme. These are the sites of critical breakthroughs in overcoming barriers to spaceflight and of significant events leading to the first landing of a man on the moon. The theme represented by these sites starts in 1915 with the formal beginnings of America's technological base for flight, extends to 1972 with the conclusion of man's successful exploration of the moon, and includes the unmanned scientific exploration of the earth, planets, and solar system.

The Man in Space sites include wind tunnels, rocket engine and development test facilities, launch complexes, training facilities, spacecraft and hardware test facilities, mission control and tracking centers, and other support facilities throughout the United States. In addition to these 26 sites, the study discusses the 18 installations that played an important role in the early American space program and/or have value for interpreting the history of the program to the public. Other space museums and facilities that provide interpretive and educational opportunities related to the exploration of space are also briefly described.

CONCERNS

The primary concern of this study is how best to tell the overall Man in Space story through interpretation and preservation of the 26 Man in Space sites. The National Aeronautics and Space Administration, U.S. Air Force, U.S. Army, and Smithsonian Institution, which are responsible for these sites, have raised a number of related concerns: 1) management arrangements to effectively protect significant resources

while minimizing potential conflicts with other agency programs, 2) funding to support interpretation and preservation of Man in Space sites, 3) provision of interpetation and visitor use, recognizing the need to maintain security and safety, 4) definitions of preservation to allow for reasonable modifications to accommodate technological changes or demolition after adequate documentation, and 5) requirements for compliance with the National Historic Preservation Act without unnecessary delays in implementing new missions and projects.

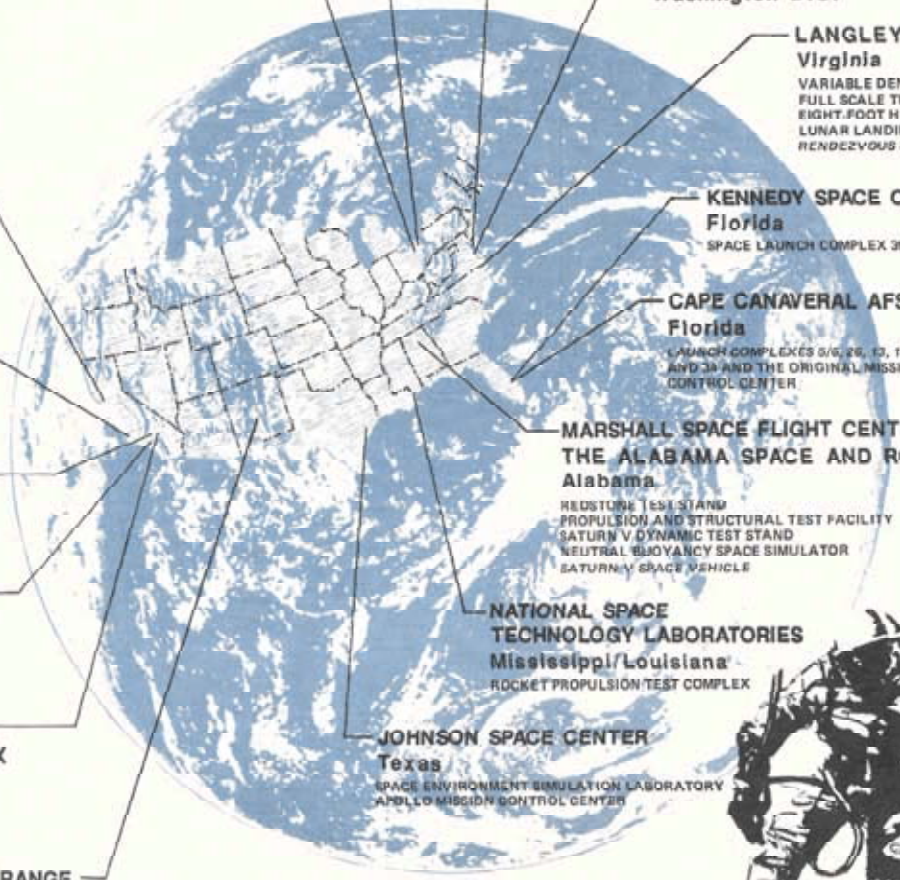
The House Committee on Interior and Insular Affairs specifically requested that this study examine alternatives for protecting the launch complex 26 service structure at Cape Canaveral Air Force Station and the Apollo launch tower at the Kennedy Space Center. Both of these structures are in immediate danger of being demolished or scrapped.

RESOURCE ANALYSIS

One of the requests from Congress was that this study prioritize the 26 Man in Space sites for permanent preservation, display, and interpretation based on historic significance, ease of public access, amount of current visitation, and immediate and long-term costs. The 26 sites have been evaluated and ranked according to their interpretive/visitor use potential and grouped according to their preservation potential. Interpretive/visitor use potential is based on significance in representing the Man in Space theme, accessibility to the public, and amount of current visitation; the site ranking is indicated in table 1 in the "Resource Analysis" section of this report. Preservation potential is based on whether the site is currently being used for agency programs or is no longer in use, degree of threats to the site, amount of remaining historic fabric, and interpretive/visitor use potential. Although all of the 26 sites are nationally significant, they have been placed into one of four groups according to their preservation potential; these groups are also discussed in the "Resource Analysis" section.

ALTERNATIVES

Four alternatives have been identified as ways of preserving and managing the 26 sites while providing educational and interpretive opportunities to the public. The report discusses the impacts of these four alternatives on management and funding, interpretation and visitor use, and site preservation. Alternative 1 would allow for each agency to continue managing the resources under current authorities. Interpretation would continue to focus on existing and future programs rather than the Man in Space theme, and resource preservation would probably continue to be a low priority. Alternative 2 would expand the role of each agency in preserving and interpreting the 26 sites. The emphasis would be on interpreting the Man in Space theme through off-site media; visitor access to the sites would not be stressed. Alternative 3 would establish a new foundation or commission to coordinate and direct preservation and interpretive programs for the sites



LEWIS RESEARCH CENTER
Ohio
ROCKET ENGINE TEST FACILITY
ZERO GRAVITY RESEARCH FACILITY

GODDARD SPACE FLIGHT CENTER
Maryland
SPACECRAFT MAGNETIC TEST FACILITY

PLUM BROOK OPERATIONS DIVISION
Ohio
SPACECRAFT PROPULSION RESEARCH FACILITY

SMITHSONIAN INSTITUTION
NATIONAL AIR AND SPACE MUSEUM
Washington D.C.

LANGLEY RESEARCH CENTER
Virginia
VARIABLE DENSITY TUNNEL
FULL SCALE TUNNEL
EIGHT-FOOT HIGH SPEED TUNNEL
LUNAR LANDING RESEARCH FACILITY
RENDEZVOUS DOCKING SIMULATOR

AMES RESEARCH CENTER
California
UNITARY PLAN WIND TUNNEL

KENNEDY SPACE CENTER
Florida
SPACE LAUNCH COMPLEX 39

CAPE CANAVERAL AFS
Florida
LAUNCH COMPLEXES 5/6, 26, 13, 14, 19, AND 34 AND THE ORIGINAL MISSION CONTROL CENTER

VANDENBERG AFB
California
SPACE LAUNCH COMPLEX 10

MARSHALL SPACE FLIGHT CENTER AND THE ALABAMA SPACE AND ROCKET CENTER
Alabama
REDSTONE TEST STAND
PROPULSION AND STRUCTURAL TEST FACILITY
SATURN V DYNAMIC TEST STAND
NEUTRAL BUOYANCY SPACE SIMULATOR
SATURN V SPACE VEHICLE

EDWARDS AFB AND
(Dryden Flight Research Facility)
California
ROGERS DRY LAKE

JET PROPULSION LABORATORY
California
TWENTY-FIVE FOOT SPACE SIMULATOR
SPACE FLIGHT OPERATIONS FACILITY

NATIONAL SPACE TECHNOLOGY LABORATORIES
Mississippi/Louisiana
ROCKET PROPULSION TEST COMPLEX

GOLDSTONE DEEP SPACE COMMUNICATIONS COMPLEX
California
PIONEER DEEP SPACE STATION

JOHNSON SPACE CENTER
Texas
SPACE ENVIRONMENT SIMULATION LABORATORY
APOLLO MISSION CONTROL CENTER

WHITE SANDS MISSILE RANGE
New Mexico
LAUNCH COMPLEX 33

INSTALLATIONS AND SITES

MAN IN SPACE STUDY OF ALTERNATIVES

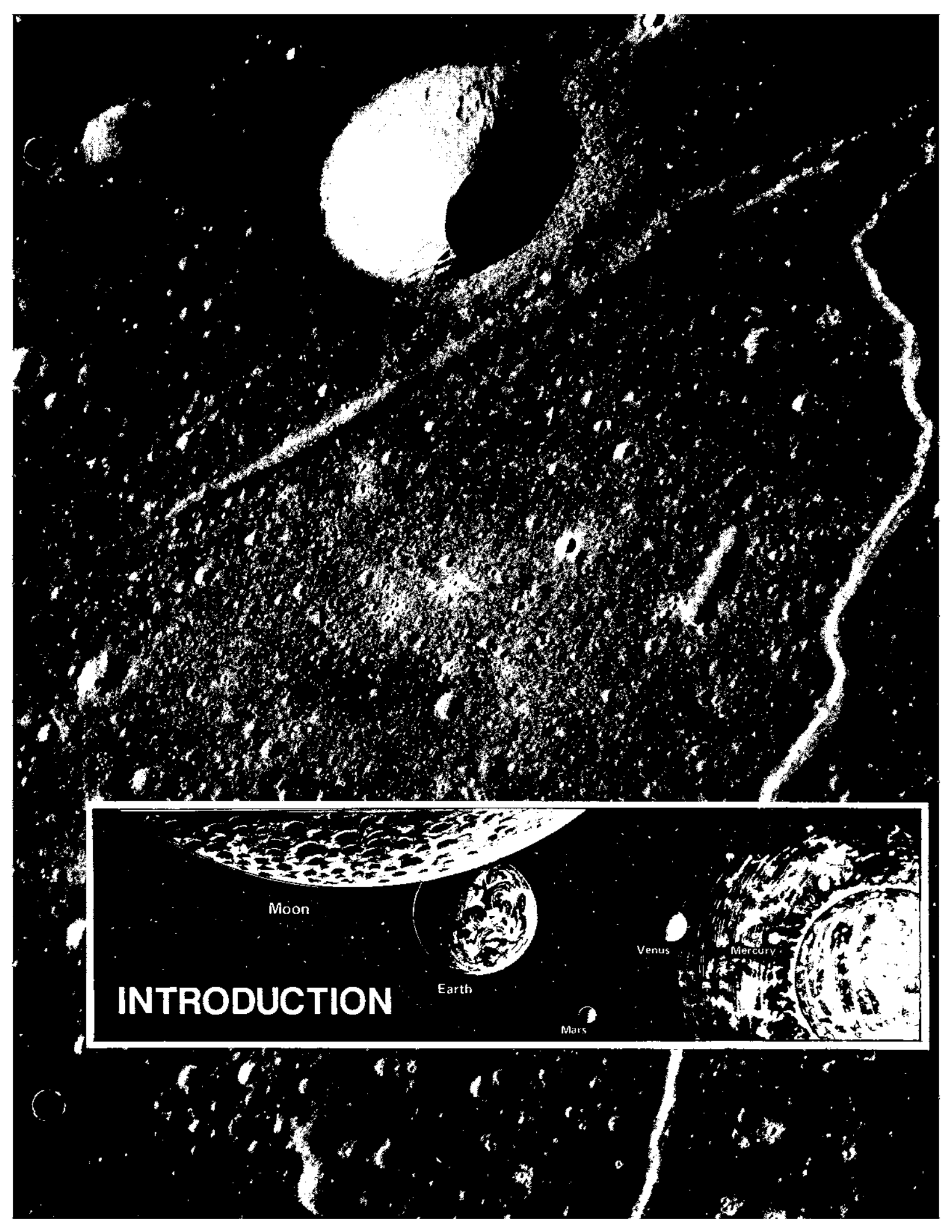
united states department of the interior/national park service

OTHER SPACE MUSEUMS AND FACILITIES

CHICAGO MUSEUM OF SCIENCE AND INDUSTRY, HENRY CROWN SPACE CENTER, IL · KANSAS COSMOSPHERE AND SPACE CENTER, KS · MICHIGAN SPACE CENTER, MI · MUSEUM OF FLIGHT, WA · NEIL ARMSTRONG AIR AND SPACE MUSEUM, OH · OKLAHOMA AVIATION AND SPACE HALL OF FAME AND MUSEUM, OK · ROSWELL MUSEUM, NM · SAN DIEGO AEROSPACE MUSEUM, CA · SPACE CENTER, NM · TITAN MISSILE MUSEUM, AZ · U.S. AIR FORCE MUSEUM, OH · U.S. NAVAL AVIATION MUSEUM, FL · WALLOPS FLIGHT FACILITY, VA · WESTERN SPACEPORT MUSEUM AND SCIENCE CENTER, CA (proposed)

DSC/MAY 1987/999-40,002A

nationwide. More emphasis would be placed on providing on-site interpretation, and site preservation would receive more attention. Alternative 4 envisions a leading role for the National Park Service. Under option A of this alternative an America in Space National Historical Park would be established, focusing on key sites at Cape Canaveral Air Force Station and the Kennedy Space Center. Other Man in Space sites would become affiliated areas of the national park system. Under option B, all of the 26 sites would become affiliated areas, and the National Park Service would provide interpretive, technical, and funding assistance rather than direct management of the sites.



INTRODUCTION

BACKGROUND AND PURPOSE OF THE STUDY

The resources that supported the early American space program are as diverse as the technological and engineering innovations of the 20th century. The program and its most widely recognized accomplishment of landing men on the moon grew out of a thirst for exploration as well as a healthy spirit of competition. But even as the world paid homage to the the first manned moon landing in 1969, new goals for the space program were being set. In 1969 a presidential task force outlined goals to be reached by the beginning of the 21st century, including the launching of planetary probes, the development of a reusable spacecraft and a permanent space station, and the establishment of a series of satellites for improved communication and scientific investigation of earth. As the nation moved on to these new challenges, the vast array of launch complexes and research, testing, and training sites that were critical to early space flight were abandoned or modified to meet changing needs.

During the 1970s the abandoned facilities and equipment began to decay or rust away, and many of the structures were dismantled and salvaged to be used in new programs. Fortunately, during this period the Smithsonian Institution commenced a project that culminated in the National Air and Space Museum in Washington, D.C., the repository for many of the space and rocket artifacts dating from the years of rocketry experiments to the present. Visitor centers were also established at major installations to exhibit the rocketry and hardware of the "space race" days. Over the years visitor centers and other museums across the country have preserved thousands of space artifacts, and their efforts have been enthusiastically received. However, despite these preservation efforts, many significant resources are in danger of being lost and need to be preserved. These resources also possess tremendous interpretive and educational potential that is not being fully realized. Most interpretive programs and media focus on present and future space efforts and do not highlight earlier achievements. The resources remaining from the early American space program can provide a dramatic vehicle for discovering this exciting aspect of our history and for stimulating interest in the space-related sciences.

It was the need to preserve and interpret the most significant sites and events remaining from the early American space program that led Congress to pass Public Law 96-344 in 1980. Section 18 of that law directed the secretary of the interior, in consultation with the National Aeronautics and Space Administration, Department of Defense, and other concerned entities, to conduct a study of the sites and events associated with the theme Man in Space. The purpose of the study, as defined by PL 96-344, was to "identify the possible locations, components, and features of a new unit of the national park system commemorative to this theme, with special emphasis to be placed on the internationally historic event of the first human contact with the surface of the moon." The legislation further directed that the study investigate methods for safeguarding identified locations, structures, and instrumentation features and for displaying and interpreting them to the visiting public. The

governmental entities that manage these locations, structures, and features were requested to preserve them from destruction or change insofar as possible during the study and the congressional review period.

In 1981 the National Park Service, in consultation with NASA and the U.S. Air Force, prepared the Reconnaissance Survey, Man in Space. The survey documented the preliminary findings concerning the historic resources associated with the early American space program (with emphasis on the first moon landing), provided an overview of the program, described the primary sites and installations, and indicated the significance and condition of those sites and installations. It determined that the sites remaining from the early manned space program were nationally significant and could make an important contribution in illustrating the Man in Space theme--a theme that was poorly represented in the national park system (see appendix D for a discussion of national park system theme representation). The survey recommended two additional studies: a national historic landmark theme study, and a study of alternatives involving the private and public entities that would contribute to preservation, use, and overall management of the sites.

The "National Historic Landmark Theme Study (Phases I and II)" was completed in 1984. It inventoried and evaluated more than 300 resources in relationship to the Man in Space theme. The study recommended 25 of the sites for designation as national historic landmarks because of their national significance. These sites represent the best and most important remaining examples of the technology needed to land a man on the moon and to explore the earth, planets, and solar system.

In March 1983 the House Committee on Interior and Insular Affairs sent a letter to the secretary of the interior requesting that the Park Service initiate the study of alternatives. Congress had previously requested that this study contain a discussion of practical preservation methodologies and action alternatives for preserving and interpreting resources determined to be significant. The study of alternatives began in October 1984 with orientation sessions involving the Park Service, NASA, the Air Force, the Army, and the Smithsonian Institution. In addition, the study team visited the White Sands Missile Range, the Cape Canaveral Air Force Station and Kennedy Space Center, the Marshall Space Flight Center, and the Alabama Space and Rocket Center. However, in December 1984 the study of alternatives was postponed pending the designation of the national historic landmark sites.

In August 1986 the House Committee on Interior and Insular Affairs requested that the study of alternatives be completed, as outlined in PL 96-344 and their 1983 letter to the secretary of the interior, and that recommendations for preservation, display, and interpretation of candidate structures be made to their committee. They asked that the candidate structures be prioritized taking into account historic significance, ease of public access, amount of current visitation, and immediate and long-term maintenance costs. In addition, they requested that the Park Service work with the Air Force to establish alternatives to dismantling the launch complex 26 service structure at Cape Canaveral and study possibilities

and alternatives to support a private fund-raising campaign for reassembly of the Apollo launch tower at the Kennedy Space Center.

In October 1986 the secretary of the interior responded to the Committee on Interior and Insular Affairs request, stating that the Park Service would proceed immediately with the Man in Space study of alternatives.

SCOPE OF THE STUDY

Based on the results of previous work, this Study of Alternatives focuses on the 25 national historic landmarks and one nationally significant site that are listed on the National Register of Historic Places. Although these 26 sites represent only a fraction of the technological resources that supported the early American space program, they are considered to best illustrate the theme of Man in Space.

For the purposes of this study, the term early American space program is considered synonymous with the Man in Space theme, which is defined to include the events and technological developments from 1915 to 1972 that contributed to early manned spaceflight, the first manned moon landing, and subsequent lunar explorations as well as unmanned scientific exploration of the earth, planets, and solar system. The year 1915 marked the formation of the National Advisory Committee for Aeronautics and the formal establishment of America's technological base for flight; 1972 witnessed the last lunar exploration mission. The effort to achieve spaceflight and reach the moon during this period involved years of work by thousands of people at diverse sites throughout the country, and it exemplified the thirst for exploration, tremendous ingenuity, and healthy spirit of competition that are part of our nation's heritage. It is recognized that the Man in Space story is ongoing and that present and future achievements in the space program will undoubtedly result in the theme being expanded to recognize these achievements. However, this study concentrates on the historic sites of critical breakthroughs in overcoming barriers to spaceflight and of significant events in the early American space program.

This study also addresses the 18 installations that contain the 26 sites and/or play a major role in interpreting the early American space program to the public. Sixteen of these installations are involved in research, testing, and training for the space program. Two additional installations--the state-owned Alabama Space and Rocket Center and the Smithsonian's National Air and Space Museum--display space artifacts and objects. These installations are addressed because they contain visitor centers or offer interpretive and educational programs that are important in telling the Man in Space story. A number of other space museums and facilities that provide interpretive and educational opportunities related to the American space program are also briefly described. Actions considered in this study are not intended to duplicate ongoing interpretive efforts, but rather to supplement existing services with media and programs that focus on the Man in Space theme and the relationship of the 26 sites to that theme.

STUDY CONCERNS

The following concerns have been expressed by the agencies participating in the Man in Space study. They are addressed in this study, and solutions are reflected in the range of alternatives.

MANAGEMENT

Management of the 26 sites varies depending on agency program requirements and funding levels. NASA's primary mission is to assure that the United States is a leader in aeronautical and space science and technology. The Air Force and Army are responsible for national security. NASA, Air Force, and Army sites are managed based on their status: active, standby, or inactive. Active sites are modified, as needed, to adapt to rapidly changing technology and new programs. Sites in standby status are maintained to ensure their usefulness in the future. If reactivated, they could be modified. Inactive sites have no anticipated use in the space program and are maintained to varying degrees; many have been salvaged or have potential salvage value. To date preservation of these sites has not been given a high priority. The need for preservation of the 26 sites should be balanced with space and defense projects.

The managing agencies currently utilize the services of contract, concession, and volunteer personnel, in addition to agency personnel, to carry out interpretation, maintenance, and preservation at many of the Man in Space sites and installations. The potential to rely further on these personnel for interpretation, maintenance, and preservation services needs to be explored.

Although the National Park Service and the Smithsonian do not manage any of the Man in Space sites, they can provide guidance and technical assistance in the preservation and interpretation of resources. The Park Service has a staff of professionals knowledgeable in the fields of historic preservation and interpretation, and the Smithsonian is an acknowledged leader in artifact preservation and display. The role of these two agencies in preserving and interpreting the Man in Space sites needs to be identified.

FUNDING

Currently, historic preservation and interpretation projects compete with other priority projects for a share of the managing agency's budget. At NASA, Air Force, and Army installations, preservation and interpretation of Man in Space sites are relatively low funding priorities, and when budget cuts are made, these activities are generally the first to be eliminated from the program. If the Smithsonian or the Park Service was responsible for any Man in Space preservation and interpretation activities, those projects would have to compete with other projects

programmed in their budgets. If Man in Space projects were given a high priority by any of the agencies, other projects and programs would have to be eliminated or cut back.

It does not appear practical to rely on funds currently appropriated in agency budgets to assure permanent preservation, interpretation, and visitor use of these significant sites. However, there are other sources such as corporate donations (money or services), private/public fund-raising, increased or new user fees, and additional appropriations that have potential.

INTERPRETATION AND VISITOR USE

The 26 Man in Space sites best represent the early American space program and the effort to land a man on the moon. They are currently interpreted on tours or at installation visitor centers, but interpretation of their contributions to the early American space program varies widely. Educational opportunities are afforded through NASA's teacher resource centers located throughout the country; these centers provide space-related educational materials for use in the classroom. However, for the most part, the focus of interpretive and educational efforts is on present and future space programs and not on the early American space program.

Many sites are not accessible to the general public because of safety and security concerns, although they may be toured by organized groups who have made arrangements ahead of time. Since these sites are not easily accessible to the public, they must be interpreted off-site, usually at the installation visitor centers.

The interpretive potential of the 26 sites has not been fully realized. It is not likely that unrestricted public access to all the sites will ever be feasible, but many actions can be taken to improve interpretation. The challenge is to provide the public with an overview of the Man in Space theme and to relate the significance of each site to the overall story. Visitor enjoyment, appreciation, and understanding of the Man in Space theme can be greatly enhanced by coordinating and expanding the focus of interpretive efforts beyond current and future space programs and by developing on-site and off-site movies, slide shows, displays, exhibits, publications, and active demonstrations. There is also the potential to coordinate with other space museums and facilities in providing interpretive media related to the Man in Space theme and the 26 sites.

This study does not identify specific interpretive programs and media for the Man in Space sites, but it does prioritize the sites and their installations according to their interpretive/visitor use potential. The evaluation of interpretive/visitor use potential is presented in the "Resource Analysis" section.

PRESERVATION

The term preservation encompasses many treatments--from recording and documenting a site before modification or demolition to restoration or total reconstruction. Decisions about preservation levels and treatments for the NASA, Air Force, and Army sites are directly affected by their status (active, standby, or inactive), condition, and location.

The early American space program, especially during the late 1950s and 1960s when most activities occurred, has been based on rapidly evolving technology. This has led to the abandonment or adaptation of many sites whose value to the effort lasted only until new systems were designed for more advanced missions. Sites that have been adapted or reworked to meet changing needs have lost some of their historic fabric but remain significant because of their role in the early American space program; many of these sites are still in active use. Other sites are on standby or inactive status (no future use currently scheduled) but still retain most of their historic fabric. These facilities could be altered in the future or could be used in their current condition to support present and future space programs. Some inactive sites have been salvaged and are no longer used. They have lost much of their historic fabric but remain significant because of their role in the early American space program. The status and condition of the 26 sites are important factors in evaluating them for preservation.

The location of a site plays a role in determining the appropriate type and level of preservation. For example, sites in Florida are in a corrosive environment that is especially destructive, whereas sites in desert locations in the west are generally less affected because of the dry temperate climate. Environmental conditions must be considered when selecting preservation treatments.

This study does not propose specific preservation treatments for the Man in Space sites, but it does group the sites according to their preservation potential. The preservation potential of the sites is indicated in the "Resource Analysis" section.

COMPLIANCE

There are numerous laws that affect the manner in which an agency carries out its mission. Of particular importance to this study is the National Historic Preservation Act of 1966, as amended, and specifically sections 106 and 110(f) of that act. Section 106 directs all federal agencies to take into account the effect of their actions on historic properties and to afford the Advisory Council on Historic Preservation an opportunity to comment on those actions and their effects. Section 110(f) mandates a higher standard of consideration than section 106 for undertakings that may affect national historic landmarks directly and adversely.

Executive Order 11593 and other federal regulations define the implementing procedures for section 106 and 110(f) compliance: Federal agencies are required to inventory all historic sites under their jurisdiction and to develop plans for the treatment and preservation of those resources; where an agency's actions could result in the loss of resources, timely steps must be taken to record the sites through measured drawings, photographs, histories, and maps of the property to be deposited in the Library of Congress. The Historic American Building Survey/Historic American Engineering Record (HABS/HAER) Division of the National Park Service has developed standards for recordation and documentation.

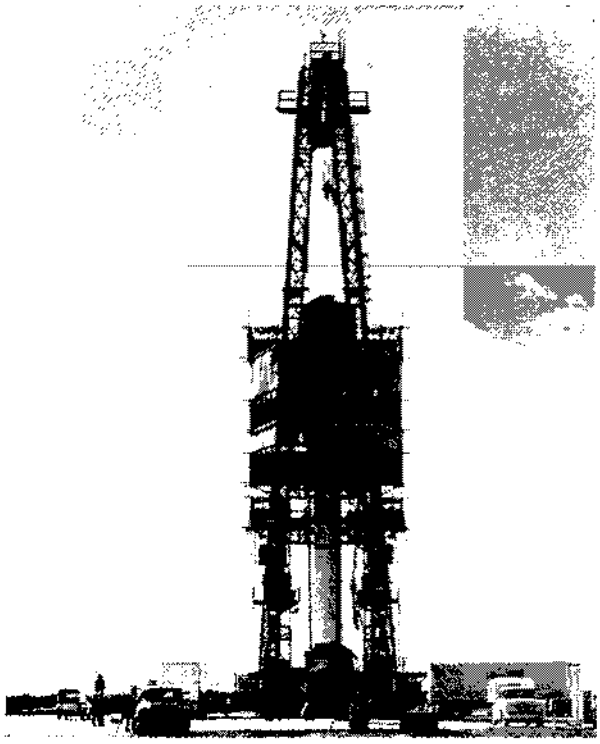
The principal implementing regulations for section 106 and portions of section 110(f) were promulgated by the Advisory Council and are contained in 36 CFR 800, "Protection of Historic Properties." The regulations set up a consultation process involving the agency, the state historic preservation officer, and the Advisory Council to resolve conflicts between development and preservation needs. In addition, sec. 800.10 recognizes the special needs of national historic landmarks. Finally, there is a provision in the regulations (sec. 800.13) for the development of programmatic agreements. Such agreements provide a mechanism for agencies to fulfill their section 106/110(f) responsibilities for a particular program, a large or complex project, or a group of undertakings that would otherwise require numerous requests for comments. The Advisory Council strongly encourages the development of such agreements for many of the Man in Space sites.

The agencies that manage the Man in Space sites are concerned about meeting all the legal requirements of sections 106 and 110(f) while continuing to modify, salvage, or deactivate sites as ongoing programs warrant. The opportunity exists for these agencies to gain a broader knowledge of sections 106 and 110(f) and to work closely with the Advisory Council and the appropriate state historic preservation officers to respond to all legal requirements without affecting the progress of ongoing and future programs.

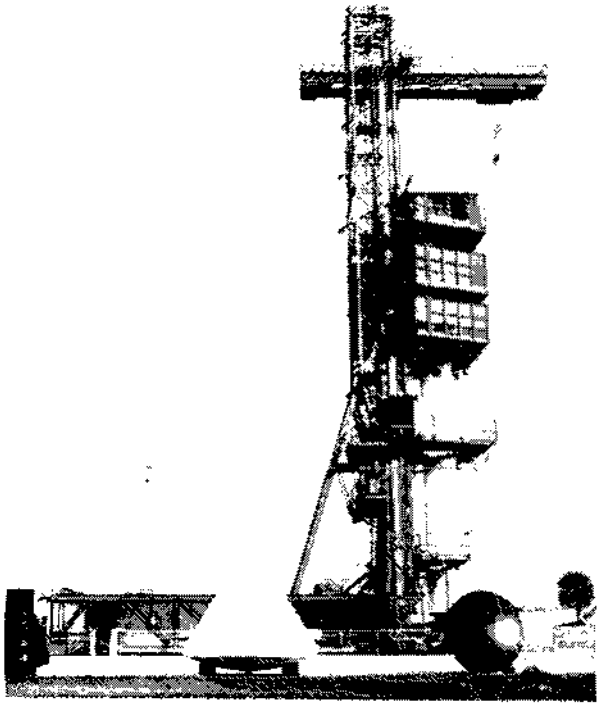
LAUNCH COMPLEX 26 SERVICE STRUCTURE

The House Committee on Interior and Insular Affairs requested that the Park Service work closely with the Air Force to establish alternatives to dismantling the launch complex 26 service structure at Cape Canaveral. It is part of a larger national historic landmark district that includes launch complexes 5/6, 26, 13, 14, 19, and 34 and the original mission control center. The significance of the service structure has been documented--it launched the first American satellite into space and is the last of its type remaining. However, there are several concerns that merit special attention: (1) Because of its deteriorated condition, the service structure has become a safety hazard; (2) it was estimated in 1985 that it would cost $1.25 million to restore the service structure to a maintainable condition and $77,000 for annual maintenance (these were only preliminary estimates; it is possible that further study might indicate

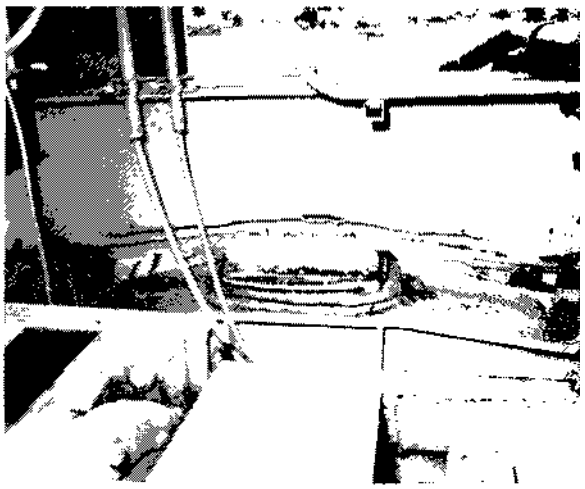
LAUNCH COMPLEX 26 SERVICE STRUCTURE



Preparation for Mercury/Redstone 2 launch of chimpanzee Ham, 1961



Fence and protective wires to protect visitors, 1986



Typical corrosion on service structure

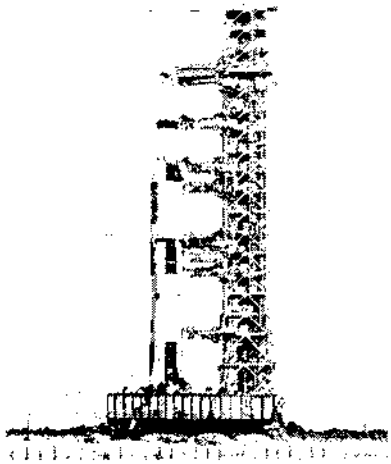
even higher costs); (3) the service structure may be so deteriorated that most of its structure would have to be replaced, diminishing its historical integrity (further study could confirm or deny this suspicion); and (4) based on the results of an environmental assessment prepared in 1986, the Air Force submitted a preliminary case report to the Advisory Council for the removal of the complex 26 service structure. Before any decision is made to preserve the structure in place, an in-depth engineering study needs to be performed to determine whether long-term preservation is feasible. The Air Force has agreed not to dismantle the service structure until Congress has had an opportunity to review this Study of Alternatives.

APOLLO LAUNCH TOWER

The House Committee on Interior and Insular Affairs also requested that the Park Service study possibilities and alternatives to support a fund-raising campaign for reassembly of the Apollo launch tower that is part of launch complex 39 at the Kennedy Space Center and is listed on the National Register as nationally significant. At one time there were three Apollo launch towers; however, two of them have been modified for the shuttle program. The third, of concern in this study, has been disassembled and stored. This tower launched Apollo 11 toward the first moon landing and is the only complete Apollo launch tower remaining.

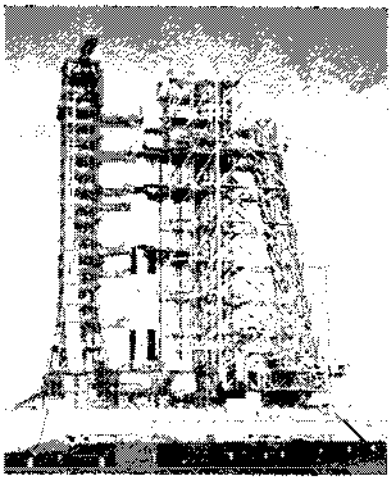
The Apollo Society is a small nonprofit membership organization. It is an outgrowth of a coalition of national preservation and space organizations that have worked with NASA to save the Apollo launch tower. The society has proposed that the launch tower be reassembled--complete with an elevator for guided tours--and that a simulated pad 39B base (with flame trench, octagonal concrete pad, and flame deflector), a stationary reproduction of the launching platform, and an authentic reproduction of a Saturn V space vehicle and Apollo command module be constructed. The launching platform would house the interpretive media and visitor services. Proposed activities would include a hands-on exhibit area and elevator rides to the top of the tower. The society's efforts to raise the $20 million ($15 million capital cost and $5 million for long-term maintenance) for the project have to date been unsuccessful. It is important to note that the society feels that obtaining donations from the private sector has not been fully explored and that with the necessary expertise and organization, a major fund-raising effort can be undertaken.

APOLLO LAUNCH TOWER

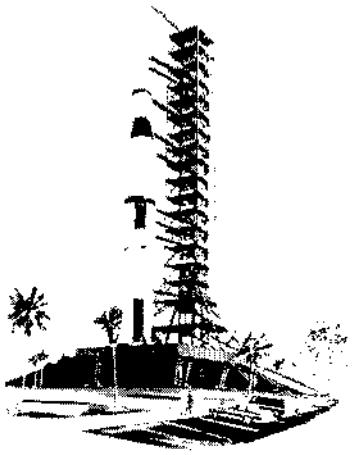


Launch tower, Saturn V space vehicle, crawler-transporter, and mobile launcher, 1968

Disassembled launch tower, 1986



Launch pad 39A, Apollo 11 spacecraft, and Saturn V launch vehicle, 1969



Artist's sketch, Apollo Society proposal

RESOURCE DESCRIPTION

OVERVIEW

In the past few decades mankind has begun one of the greatest adventures in the history of the human race--the exploration of space. By coupling a new technology and an old tradition of exploration, men have orbited the earth, landed on the moon, and sent unmanned probes to the planets. This yearning to escape the confining bonds of the earth's gravity and atmosphere is an ancient dream of man. As early as the 2nd century A.D., the Greek writer Lucian of Samosata wrote of an imaginary journey to the moon. In 1865 Jules Verne published the classic account of a moon voyage in which earthlings are propelled to the moon by a giant cannon.

While some men were dreaming and writing about travel to the moon, others such as Johannes Kepler, Galileo Galilei, and Isaac Newton were laying scientific groundwork in the areas of mathematics, physics, and astronomy that would permit the actual deed to be achieved. By the early 20th century Samuel Pierpont Langley and the Wright brothers were experimenting with the actual mechanics of heavier-than-air flight. The Wright brothers were the first to succeed when on December 17, 1903, they carried out "the first [flight] in the history of the world in which a machine carrying a man had raised itself by its own power into the air in full flight, had sailed without reduction in speed, and finally landed at a point as high as that from which it started" (NPS, Butowsky 1980).

After the 1903 flight the development of the airplane proceeded rapidly. In 1915 Congress established the National Advisory Committee for Aeronautics (NACA) "to supervise and direct the scientific study of the problems of flight, with a view to their practical solution" (NASA, Anderson 1981a). Knowledge of aeronautical science and aviation technology increased dramatically under NACA guidance as witnessed by such achievements as the nonstop flight of Charles Lindbergh from New York to Paris in 1927.

NACA remained a small agency until World War II. During that war the United States faced the possibility of German-developed aircraft that could fly at speeds in excess of 400 miles an hour and at heights above 40,000 feet. To support Allied war efforts and compete with German technology, the United States initiated experiments that eventually led to the development of the X-1, the craft that exceeded the speed of sound on October 14, 1947. Within a decade after the end of the war, American jet-powered and rocket-powered aircraft had explored the upper limits of the atmosphere, flying at an altitude of 80,000 to 90,000 feet.

The next logical step was spaceflight. However, unlike the airplane, which could be powered by a reciprocating or a jet engine using atmospheric oxygen for its operation, a craft that would fly above the atmosphere required the development of rockets that would carry everything needed for propulsion and operate independently from the environment.

American efforts in rocketry had been advanced in the early 20th century by Robert H. Goddard, a pioneer in the field. Working in the 1920s and 1930s, Goddard compiled an impressive record of achievements. He carried out the first recorded launching of a liquid-propelled rocket (1926), adapted the gyroscope to guide rockets, installed movable deflector vanes in a rocket exhaust nozzle scope to guide rockets, patented a design for a multistage rocket, developed fuel pumps for liquid fuel motors, experimented with self-cooling and variable thrust motors, and developed automatic parachute deployment for recovering instrumented rockets.

Although Goddard's achievements were considerable, he was not alone. During the same period interest in rocketry and space exploration developed in Europe and especially in Germany. Societies of rocket theorists and experimenters were established all over the continent. The most important of these societies, the German Society for Space Travel, conducted many rocket tests during the 1930s. By 1933 all German rocket experimentation was put under the control of the military, and progress advanced at a rapid rate. The Germans established vast research and testing facilities at Peenemuende and by 1943 developed a large rocket, the famous V-2, capable of flying over 200 miles with a speed of 3,500 miles per hour. This was the rocket used to bombard Allied targets late in the war.

In 1945 the United States Army captured an underground factory in the Harz Mountains that contained 100 partially assembled V-2 rockets. These rockets and about 125 German rocket specialists, including Wernher von Braun, were sent to America to continue rocket research work for the Army.

From 1946 to 1951 more than 65 V-2 rockets were fired at the Army's White Sands proving ground in New Mexico. The rockets carried monkeys aloft on four occasions. One V-2, coupled with a WAC-Corporal rocket, achieved an altitude record of 255 miles in February 1949. In July 1950 another V-2/WAC-Corporal combination was launched from Cape Canaveral, Florida, the Air Force's newly activated long-range proving ground.

As experiments continued, the supply of V-2 rockets available for research was rapidly disappearing and new rockets were needed. In June 1950 the Army moved its team of 130 German rocket scientists and engineers from Fort Bliss at El Paso to the Army's Redstone Arsenal at Huntsville, Alabama, along with 800 military and General Electric employees. This team developed the Redstone rocket. In the next five years 36 Redstone rockets were fired at Cape Canaveral to test structure, engine performance, and guidance, control, and tracking systems. During the same period the Air Force was developing a separate rocket, the Atlas, which was designed to be America's first intercontinental ballistic missile.

While America was developing the Redstone and Atlas rockets, the Russians were working on rockets of their own. On August 26, 1957, Tass, the Soviet news agency, announced the successful launch of an

intercontinental multistage ballistic rocket. This success was followed on October 4, 1957, by the launching of the world's first artificial space satellite, Sputnik 1.

In response to the Soviet achievement, the United States sought the immediate launch of an American satellite. The first launch attempt, in December 1957, failed; the second, completed by the Army test group headed by Wernher von Braun on January 31, 1958, was successful. The first U.S. satellite, Explorer 1, returned useful data from space.

By 1958 many influential members of Congress and the Executive branch had come to support the concept of a new national space program. In April the administration submitted a bill calling for the establishment of a national aeronautics and space agency, and on July 29 President Eisenhower signed the bill into law (PL 85-568, the National Aeronautics and Space Act). On October 1 the National Aeronautics and Space Administration was officially established, and most of the nation's diverse programs and interests in space exploration were consolidated under its control. One of NASA's major responsibilities was the development and accomplishment of a program to put a man in orbit. In December the agency established Project Mercury, and in April 1959 it selected the first seven astronauts for the manned space program.

During 1959 and 1960 the American space program continued to grow both in terms of money and priority. However, in April 1961 the U.S. was again upstaged when Soviet cosmonaut Yuri Gagarin rode Vostock 1 into an orbit around the earth. The Soviet achievement shook Americans as had the satellite launch four years earlier. Alan Shepard's 15-minute suborbital flight less than a month later seemed minor in comparison. Recognizing the impact of the Gagarin flight, on May 25, 1961, President John F. Kennedy proposed before Congress that the United States commit itself to a manned landing on the moon before the end of the decade. President Kennedy had correctly assessed the mood of the American people. Support was widespread. The decision to land a man on the moon was endorsed by Congress virtually without dissent.

The American program to put a man in space and land on the moon now proceeded rapidly. The program was organized into three phases: Projects Mercury, Gemini, and Apollo. Project Mercury, the manned space program that had been initiated in 1958, was executed in less than five years. The primary objectives of the project 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, and to safely recover both man and spacecraft. Six missions were successfully completed under Project Mercury, including the first U.S. orbital flight by John Glenn in 1962, and the program laid a sound foundation for the technology of manned spaceflight.

Begun in 1964, Project Gemini was the intermediate step toward achieving a manned lunar landing, bridging the gap between the short-duration Mercury flights and the long-duration missions proposed for the Apollo program. Major objectives of Project Gemini included 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.

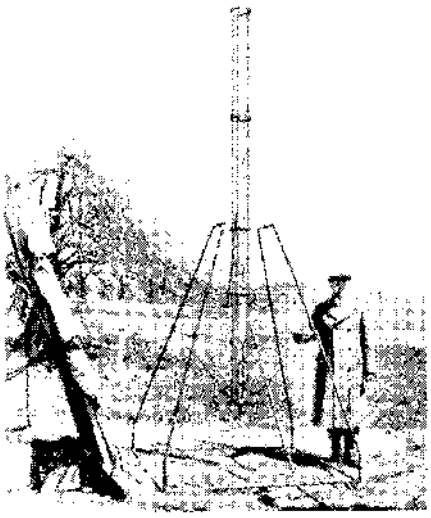
Apollo, the largest and most ambitious of the manned space programs, had as its goal the landing of astronauts on the moon and their safe return to earth. Lunar missions began in December 1968. The first four manned missions, Apollos 7, 8, 9, 10, marked the successful completion of all the complicated lunar orbital maneuvers--the first moon orbit, the first manned flight of a lunar module, and the separation, rendezvous, and docking of the lunar module with the command and service modules--paving the way for the moon landing attempt.

On July 20, 1969, the goal of landing a man on the moon was achieved when Apollo 11 astronauts successfully executed history's first lunar landing. Commander Neil Armstrong and lunar module pilot Edwin Aldrin set foot on the surface, while pilot Michael Collins orbited in the command module.

The "giant leap for mankind" was followed by six additional moon missions, during which extensive exploration and sample collection were successfully conducted. Experimental equipment was set up on the moon, which continues to send valuable scientific data back to earth. Lunar samples, photographs, and other information received will provide scientific research opportunities for years to come. The last manned landing on the moon occurred in December of 1972.

Coinciding with the manned space effort was the initiation of the unmanned space program. Scientific achievements ranged from geophysical and atmospheric studies to astronomical and planetary exploration. The successful launch of Explorer I in February 1958 opened a new world of scientific investigation, which will continue into the future.

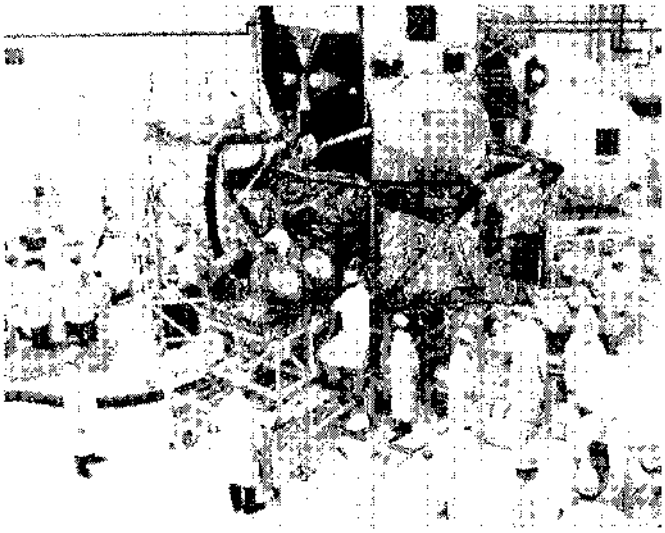
OVERVIEW



Robert H. Goddard, the Father of American Rocketry, 1926

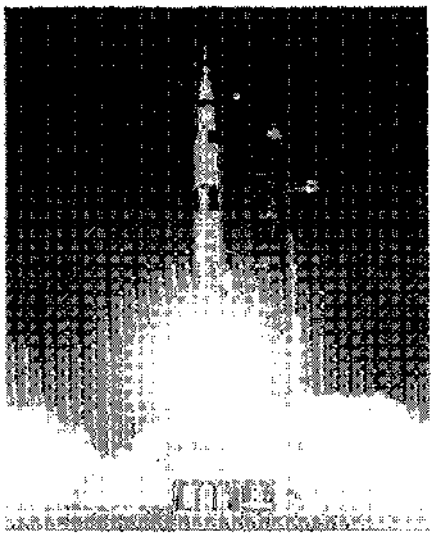
John F. Kennedy's speech, May 25, 1961

Chimpanzee Ham ready for launch aboard Mercury/Redstone 2, 1961



Thousands of people contributed to the manned moon landing

Original seven astronauts (left to right): M. Scott Carpenter, L. Gordon Cooper, Jr., John H. Glenn, Jr., Virgil I. "Gus" Grissom, Walter M. Schirra, Jr., Alan B. Shepard, Jr., and Donald K. "Deke" Slayton



Launch of Apollo 11/Saturn V space vehicle on the nation's first manned lunar landing mission, 1969

Astronaut Edwin E. Aldrin, Jr. with American flag during Apollo 11 mission, 1969

MAN IN SPACE SITES

The early American space program encompassed years of work by thousands of scientists, technicians, and others resulting in a successful space exploration program. The story of this endeavor can be told to the American public by presenting the overall Man in Space theme at the 26 nationally significant sites and illustrating how they supported the space effort. The early American space program--the events and technological developments from 1915 to 1972--is referred to in this study as the Man in Space theme. Together, the 26 sites represent this theme and provide a comprehensive understanding of manned and unmanned space exploration.

Following is a description of the Man in Space sites. The sites are grouped according to resource type (for example, wind tunnels, launch complexes), and their historical function, significance, condition, status, and current interpretive/visitor use programs and activities are described. This information has been used in evaluating each site's interpretive/visitor use and preservation potential. The site evaluations are included in the "Resource Analysis" section of this study.

WIND TUNNELS

These four sites represent the technological base of aeronautical research facilities created by the National Advisory Committee for Aeronautics. From this base the early American space program was initiated.

Variable Density Tunnel, Langley Research Center

The variable density tunnel was a research tool superior to that found anywhere else in the world. It predicted flow characteristics of test aircraft models more accurately than any other tunnel then in existence. All variable density tunnels now in operation are an extension of the idea first formulated and put into operation here in 1921. This was the world's first pressurized wind tunnel.

The basic structure of the tunnel and a major portion of the original fabric and mechanical systems remain intact. Although it is inactive and there are no plans for its future use, it is housed in a building with active facilities. The site receives little visitation and is opened to organized groups only. There is no on-site interpretive media, and few interpretive materials are provided at the Langley visitor center.

Full Scale Tunnel, Langley Research Center

Built in 1931, the full scale tunnel (historic name--30- by 60-foot tunnel) allowed NACA engineers to test actual aircraft. Before and during World War II practically every high performance aircraft used by the United

States was checked out in the full scale tunnel. For most of the war it was the only tunnel in the world capable of performing these tests.

Although the full scale tunnel has been modified over the years, a major portion of the original fabric is intact. The versatility of the tunnel is demonstrated by the fact that it is still in active use, continues to be a major research tool, and contributes to the design of new generations of aircraft. Like the variable density tunnel, it receives little visitation, mostly by organized groups. There is no on-site interpretive media and little information at the visitor center.

Eight-Foot High Speed Tunnel, Langley Research Center

Originally built in 1936, the eight-foot high speed tunnel (common name--eight-foot transonic tunnel) was the first to employ a slotted throat design. This landmark wind tunnel design, which was incorporated in 1950, gave aircraft designers accurate data on airframe performance in the transonic range and permitted them to test large models and actual working parts of airplanes.

The basic structure of the tunnel is in poor condition and continues to deteriorate. A portion of the original test section is now used for offices and storage. The tunnel was deactivated in 1956 and has lost much of its original historic fabric because of lack of maintenance and changes in functional use. The tunnel is open to organized groups only and is seldom visited. There is no on-site interpretive media and little information at the visitor center.

Unitary Plan Wind Tunnel, Ames Research Center

The unitary plan wind tunnel (common name--unitary plan facility) was built between 1950 and 1955 and represents the continuing effort by NASA to provide American aircraft and aerospace industries with superior technical aeronautical research facilities after the end of World War II. In the 1960s and 1970s almost all NASA manned space vehicles were tested in this complex.

The tunnel complex has been modified several times over the years, still exhibits a high degree of integrity, and continues to be used. The tunnel is open to organized tour groups on a limited basis and receives little visitation. There are no on-site interpretive exhibits, and there is no visitor center at the Ames Research Center.

ROCKET ENGINE DEVELOPMENT FACILITIES

These sites illustrate the important role of the Lewis Research Center in developing hydrogen as a fuel for the Centaur and Saturn V rockets. The development of the Centaur and Saturn V rockets was crucial to the manned and unmanned space programs.

Rocket Engine Test Facility, Lewis Research Center

The rocket engine test facility (common name--rocket propulsion test facility) was completed in 1957 and pioneered the technology necessary to handle hydrogen as a rocket fuel.

The test facility is currently in active use and, despite modifications, retains a high degree of integrity. Groups can arrange to visit the facility, and interpretive exhibits are located in the shop area. The only interpretation at the Lewis visitor center depicting the rocket engine test facility is a film shown periodically.

Zero-Gravity Research Facility, Lewis Research Center

Built in 1966, the zero-gravity research facility is the only known facility of its size in the free world capable of performing tests in a reduced gravity environment and is the only NASA facility that can study the behavior of liquids in such an environment. Knowledge of the characteristics of liquids in a space vehicle was essential to the successful completion of the early American space program.

The research facility, like the rocket engine test facility, is currently in active use and, despite modifications, retains a high degree of integrity. Groups can arrange visits, and interpretive exhibits are located in the shop area. The only interpretation at the visitor center is the film shown periodically.

Spacecraft Propulsion Research Facility, Plum Brook Operations Division of Lewis Research Center

Built in 1968, the spacecraft propulsion research facility was designed for hot-firings of full-scale Centaur engines in simulated space conditions. It is the only facility that can hot-fire a large rocket while simulating the vacuum cryogenic temperatures and thermal radiation of space. The Centaur rocket launched some of the country's most important space probes.

The facility has had few modifications over the years and retains its original fabric. It currently is maintained on standby status and would likely be modified if reactivated to accommodate new programs. The site is open only to organized groups and receives very little visitor use. There is no on-site interpretive media and none is provided at the Lewis visitor center 60 miles to the east.

ROCKET ENGINE TEST STANDS

These sites represent the role of the Marshall Space Flight Center in the building and testing of actual rocket engines. Before any rocket was flown or used on a manned mission, the engine was test-fired in a static test stand to verify its flight status.

Redstone Test Stand, Marshall Space Flight Center

Built in 1953, the Redstone test stand (common name--interim test stand) was the first static firing facility at Marshall. It was the first test stand in the United States to accommodate an entire launch vehicle for static tests and was an important facility in developing the Jupiter C and the Mercury-Redstone vehicles that launched Alan Shepard, Gus Grissom, and the first American satellite into space.

The Redstone test stand has been preserved in place and has a high degree of integrity. The test stand is inactive and is interpreted on-site by signs and a tour guide. It is part of a bus tour that originates at the nearby Alabama Space and Rocket Center and includes a number of other sites at Marshall. Visitors are allowed to disembark and tour the test stand. The narrated interpretive program is interesting, but it does not describe the role of the test stand in the early American space program. Limited interpretation is also provided at the Alabama Space and Rocket Center, which houses the Marshall visitor center. It is estimated that 130,000 people visited the site on bus tours in 1986.

Propulsion and Structural Test Facility, Marshall Space Flight Center

Built in 1957, the propulsion and structural test facility (common name--solid motor structural test facility) was important in the testing of the Saturn IB vehicle, and it represents the evolution of test stand technology from the days of the U.S. Army Redstone missile to the solid rocket boosters used on the space shuttle today. The American space program would not have succeeded without the years of testing at this facility.

Despite its active status and changes made to accommodate testing of the solid rocket booster, the facility retains much of its original historic fabric. Visitors are not allowed to enter the site, but they can view it from a distance as part of a bus tour. On-site interpretive signing is limited, and the tour narrative does not place the facility in its historical context. Little interpretive information on this facility is provided at the Alabama Space and Rocket Center. Approximately 130,000 people visit the site each year.

Rocket Propulsion Test Complex, National Space Technology Laboratories of the Marshall Space Flight Center

The rocket propulsion test complex (common name--A-1/A-2, B-1/B-2 test stands) was built in 1965 and provided the critical final step in certifying the first and second stages of the Saturn V rocket for flight. All Saturn V rockets used in the Apollo program were tested and man-rated for spaceflight here.

The stands have been modified for shuttle program activities and are still in use. They are in excellent condition and retain a high degree of

integrity. The complex is open to visitors in organized groups. There is no on-site interpretive media and only limited interpretive material at the National Space Technology Laboratories visitor center.

ROCKET TEST FACILITY

This site represents the role of the Marshall Space Flight Center in the final testing of the moon mission rocket. Tests conducted here gave NASA and industry engineers their last chance to detect and correct any flaws in the fully assembled Saturn V.

Saturn V Dynamic Test Stand, Marshall Space Flight Center

This test stand (common name--dynamic structural test facility), built in 1964, illustrates another facet of the building, testing, and man-rating of the Saturn V rocket. After every Saturn V was tested on the firing stand, it was brought to the dynamic test stand for mechanical and vibrational tests to determine its structural integrity. Part of the extensive ground testing complex for the Saturn V rocket, it was central to the success of the manned space program.

After Saturn V testing was completed, the test stand was modified for testing the space shuttle. It is currently on standby status and retains a high degree of integrity. Visitors are not allowed to enter the site, but they can view it from a distance as part of a bus tour. On-site interpretive signing is limited, and the tour narrative does not place the facility in its historical context. Little interpretive information on this facility is provided at the Alabama Space and Rocket Center. Approximately 130,000 people visit the site each year.

ROCKET

The site displays the space vehicle designed to carry men to the moon.

Saturn V Space Vehicle, Alabama Space and Rocket Center

On July 16, 1969, a Saturn V space vehicle rose from the launch pad carrying Armstrong, Aldrin, and Collins toward mankind's first expedition to the surface of the moon. Because stages of the Saturn V are not recovered after use, a Saturn V that has actually flown is not available for public viewing. This vehicle was chosen because of its integrity and association with the Marshall Space Flight Center. All three stages of the vehicle and the instrument ring are intact and come from an original test vehicle. It is one of only three remaining Saturn Vs in the country.

The space vehicle is well maintained and exhibits a high degree of integrity. It was brought to the Alabama Space and Rocket Center while still active in the program. It is now on loan from the Smithsonian

Institution and is displayed in the Alabama Space and Rocket Center's rocket park, which is toured by over 400,000 visitors each year. Informational signs interpret each stage of the rocket as well as the lunar, service, and command modules.

The Smithsonian Institution is considering dedesignation procedures to remove this rocket from the National Register because the institution believes that such designation conflicts with its ability to properly manage objects within its collections.

LAUNCH COMPLEXES

Taken collectively, these sites represent the extensive launch network necessary to propel manned and unmanned crafts into space.

Launch Complex 33, White Sands Missile Range

Launch complex 33 (common name--White Sands blockhouse and gantry crane) was developed in 1945-1946 specifically to accommodate V-2 rocket tests at White Sands. The V-2 gantry crane and Army blockhouse represent the first generation of rocket testing facilities that led to the exploration of space and the first manned landing on the surface of the moon.

The gantry has been restored to its original V-2 configuration, including the display of a restored Hermes A-1 rocket on loan from the Smithsonian Institution. The blockhouse is currently used for maintenance activities. The complex exhibits a high degree of integrity; it is no longer used as an active launch site. People can visit a portion of the site without being in a tour group. Access is controlled, but advance arrangements are not necessary. Yearly visitation (approximately 3,500 people) is relatively low because of the site's remote location. Interpretive signs are provided at the site, and interpretive media is included in the White Sands visitor center.

Space Launch Complex 10, Vandenberg Air Force Base

The west pad at SLC-10 is one of the best surviving examples of a launch complex built in the 1950s, and the electronic equipment in the blockhouse is one of the best examples of working electronics used to support space launches during this era.

Although the complex was dismantled and then rebuilt, the blockhouse, pad, support structures, and equipment are all original. The site is in excellent condition and maintains a high degree of integrity. It receives very little visitation and is open only to organized groups. There is no on-site interpretive media and no visitor center. However, the Air Force does conduct public tours during its open houses, generally held annually.

Cape Canaveral Air Force Station

The Cape Canaveral site is a national historic landmark district with seven contributing properties. They are launch complexes 5/6, 13, 14, 19, 26, and 34, and the original mission control center. The first manned Apollo flight and all Mercury and Gemini flights were launched from or directly associated with these sites. It was this launch and flight control experience that enabled men to land on the surface of the moon. The six launch complexes are described below, and the mission control center is discussed under that group of sites.

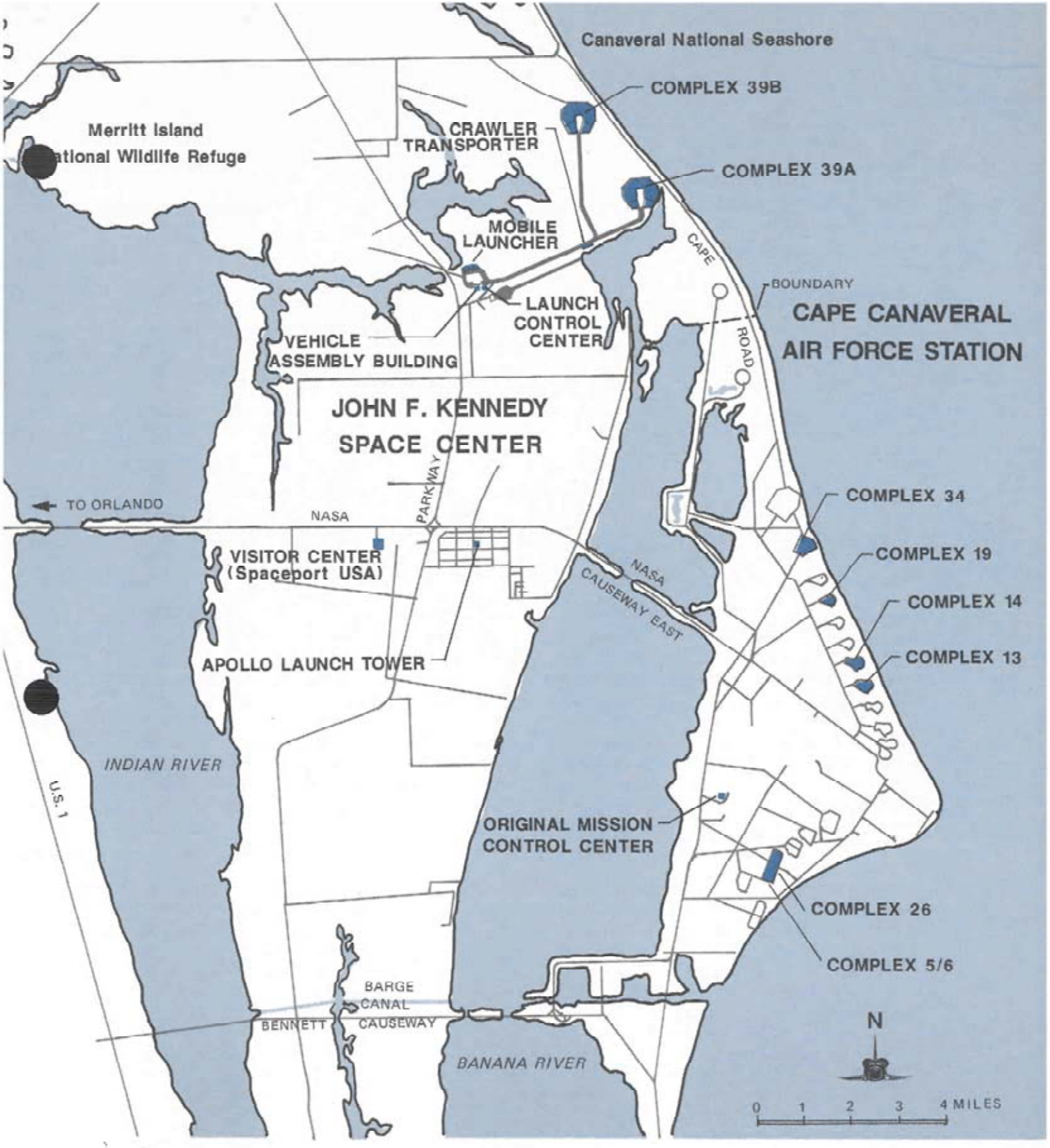
It is estimated that of the 2.2 million visitors to the Kennedy Spaceport USA visitor center in 1986, approximately 85,000 people visited Cape Canaveral on public bus tours or in organized groups. A bus tour that originates from the Kennedy Space Center's Spaceport USA stops at complexes 26 and 5/6 (Air Force and NASA space museums) and the original mission control center. The bus also passes the remaining landmark sites and numerous active and inactive launch complexes. An audio-cassette program gives an overview of Cape Canaveral during the tour. The driver provides current launch information and items of interest; however, the Man in Space story and the significance of Cape Canaveral to the early space program are not adequately described.

Launch complex 5/6 was built in 1955 for the Redstone testing programs and was used to launch the Mercury/Redstone missiles. All of the Mercury/Redstone suborbital flights were launched from complex 5/6, including Alan Shepard's Freedom 7 and Gus Grissom's Liberty Bell 7.

The complex has been modified over the years; the launch tower has been demolished and the original windows and equipment have been removed from the blockhouse. The blockhouse now houses a small NASA museum. Although certain elements are no longer at the complex, it was never modified to accommodate new programs. The complex still retains much of its original fabric and provides a sense of what an early launch complex was like. It is open to visitors, who arrive by bus and are allowed to tour the complex including the blockhouse, and is interpreted through on-site exhibits inside the blockhouse and tour guide narration.

Launch complex 26 was built in 1957 for the Redstone rocket research and development program. It was the launch site for Explorer 1, the first U.S. satellite, and other satellite launches. It was also the site of the launches of primates Ham, Gordo, Able, and Baker in tests that paved the way for Alan Shepard's Mercury suborbital flight.

The complex still retains much of its integrity, but the service structure (the only one of its type left) is in a serious state of disrepair. The complex now encompasses the Air Force Space Museum, which includes the blockhouse (original windows intact, equipment from early space program), an exhibit hall, an information kiosk and an outdoor rocket exhibit area. This complex is combined with launch complex 5/6 for visitor use purposes. It is interpreted much the same way as complex 5/6, except that Air Force volunteers conduct tours of the blockhouse



JOHN F. KENNEDY SPACE CENTER
CAPE CANAVERAL AIR FORCE STATION

MAN IN SPACE STUDY OF ALTERNATIVES
united states department of the interior/national park service

DSC/MAY 1987/999-40,001A

and exhibit hall. This interpretive program is informative and illustrates the complex's importance to the Man in Space theme. Launch complexes 5/6 and 26 and the lone remaining service structure give visitors a sense of the early American space program, particularly in contrast to the massive, technologically sophisticated launch complex 39 at the nearby Kennedy Space Center.

Launch complex 13 was built in 1956 for the Atlas research and development program and was later modified for the Atlas/Agena rocket. The complex was used for five lunar orbiter missions and the Mariner 3 mission. It closely resembles complex 14 (site of the manned Mercury orbital launches) and is the only remaining site that illustrates the support facilities required in the Mercury/Atlas launches. Its much larger launch tower contrasts sharply with the smaller tower at complex 26, depicting the changes in technology as the early American space program progressed.

The complex was deactiviated in 1978. The blockhouse is empty, and many of the support facilities are in poor condition. The launch tower structure is in fair condition. The tower is box-shaped, whereas the tower at complex 14 was trapezoidal in shape. No visitors are allowed on the site; a brief interpretive message is offered on the tour bus.

Launch complex 14 was built in 1957 to support the Atlas research and development program. It is the most significant of the Atlas complexes. All manned Mercury/Atlas flights were launched from this complex, including the first orbital flight by John Glenn. In 1965-66 the complex was used to launch the Atlas/Agenas as target vehicles for Gemini flights.

Complex 14 was deactivated in 1967. The service structure was removed and salvaged in 1976 because of structural deterioration caused by excessive rust. The launch ramp and blockhouse are still in good condition. The blockhouse is now used for storage. Although the complex has lost most of its original historic fabric, its significance is acknowledged.

A monument to the original seven astronauts has been placed at the entrance to this complex. A marker commemorating John Glenn's first orbital flight was erected on the launch ramp, and an information kiosk adjacent to the blockhouse is available for groups that make arrangements ahead of time. Though public access to the complex is controlled, the bus tour stops briefly at the monument and the significance of the site is described.

Launch complex 19 was built in 1959 and was the launch site for 10 Gemini manned orbital flights. The Gemini program marked the intermediate step between the earlier Mercury flights and the manned Apollo missions to the moon.

All electrical equipment and the launch tower and stand have been salvaged. The remainder of the site retains some of its original historic fabric. However, the fold-back erector (service structure) and the steel

portions of the launch ramp are severely deteriorated because of the corrosive environment.

A sign listing the manned spaceflights that occurred at complex 19 has been placed at the entrance to the complex for viewing on the scheduled bus tour; however, the bus does not go onto the site. Very little historic interpretation is provided on the bus tour. An information kiosk north of the launch stand interprets the historic significance of this complex for organized groups that make arrangements ahead of time.

Launch complex 34 was planned and constructed in 1959 for the Saturn I booster flight test program. Following the fourth successful Saturn I launch, the complex was modified to support the Saturn IB/Apollo spacecraft. The Apollo 7 manned space mission was launched from this site. This complex was also the site of the fire that took the lives of astronauts Gus Grissom, Edward White, and Roger Chaffee on January 27, 1967. This was the first launching site in the world built expressly for the peaceful exploration of space.

The remaining features of the complex are the launch stand, blast deflector, blockhouse, and propellant facilities. All other facilities have been salvaged over the years. The blockhouse is in good condition.

An information kiosk is adjacent to the launch stand. Photos and printed materials displayed in the kiosk interpret the complex and its significance in the Man in Space story for groups that make arrangements ahead of time. The scheduled bus tour does not stop at this site.

Launch Complex 39, Kennedy Space Center

Complex 39 (historic name--America's first spaceport) was built between 1962 and 1968 and was designed to support the huge Apollo/Saturn V space vehicles that carried men to the moon. The major support structures in launch preparation included the vehicle assembly building (VAB) where the craft was assembled on the launch vehicle; the mobile launcher--platform and launch tower--that supported the craft before and during takeoff; the mobile service structure that provided access for servicing the space vehicles while on the launch pad; the crawler-transporter that moved the mobile service structure complete with space vehicle from the VAB to the launch pad; the crawlerway upon which the crawler-transporter moved; and the launch pads (A and B) and support facilities.

At the present time, the launch pads have been modified to accommodate the space shuttle. Two of the original three Apollo launch towers have been converted on the pads for space shuttle use. The third tower has been dismantled as-is in 40-foot sections and is currently being stored in a fenced area at the Kennedy Space Center. All three mobile launchers and the mobile service structure have been converted for space shuttle use. The crawlerway, crawler-transporters, vehicle assembly building, and launch control center remain intact with modifications to accommodate

the space shuttle program. Overall, the site exhibits a high degree of integrity. Bus tours of launch complex 39 begin at the Spaceport USA visitor center and transport over 1 million people to launch complex 39 each year. Interpretation on the tour bus, which stops at various locations for viewing, focuses on the current space shuttle program. However, visitors do get a sense of the importance of the launch complex to the first and subsequent lunar landings. The bus also stops at a Saturn V space vehicle, and the narrator highlights its singular purpose--to get man to the moon.

TRAINING FACILITIES

The following sites were critical because of their association with training programs necessary to prepare American astronauts to operate in space and land on the moon.

Lunar Landing Research Facility, Langley Research Center

This facility (common name--impact dynamics research facility) was an indispensable tool that permitted NASA to train the Apollo astronauts to fly in a simulated lunar environment. This training gave Neil Armstrong and others the opportunity to safely study and practice piloting problems in the last 150 feet of descent to the surface of the moon. The facility also served as a lunar-walking simulator; its base was modeled with fill dirt to resemble the surface of the moon.

The facility is intact and retains a high degree of integrity; it is now used by NASA for aircraft impact studies. The base of the facility has been modified, and the simulated lunar landscape is gone. Associated with the facility is a full-scale Apollo lunar excursion module (LEM); the Apollo astronauts that trained at the facility are listed on the LEM. The LEM is in a deteriorated condition, and the main engine and some of the controls have been removed. Visitors may drive to and visit this site. On-site interpretation is limited to signs and an accompanying brochure, which can be obtained from the Langley visitor center. This site is not interpreted at the visitor center.

Rendezvous Docking Simulator, Langley Research Center

The docking simulator (common name--real-time dynamic simulator) is the only surviving trainer that Gemini and Apollo astronauts used to practice rendezvous and docking techniques needed to link two vehicles in space. The mastery of this skill was critical to the success of the lunar orbit rendezvous technique for landing man on the moon.

After completion of the Apollo program, the simulator was modified for other purposes. It is no longer used and although the basic simulator remains intact, many of the support facilities are gone. Currently, the simulator hangs from the ceiling of an active hangar facility. The site is

open to organized groups, but very few people visit. There is no on-site interpretive media or information at the visitor center.

Neutral Buoyancy Space Simulator, Marshall Space Flight Center

The Army built the space simulator in 1955, and until an additional facility was built at the Johnson Space Flight Center in the mid-1970s, this was the only test facility that allowed astronauts to become familiar with the dynamics of body motion under weightless conditions. Because of its capability to support research and testing of the operational techniques and materials needed to successfully perform manned space missions, the simulator contributed significantly to the American space program, especially Projects Gemini and Apollo.

The simulator is still active; however, few modifications have occurred over the years, and it retains a high degree of integrity. It is interpreted on bus tours by a driver/tour guide, but the narrative program does not clearly describe the simulator's role in the early American space program. There is little interpretive media on the simulator at the Alabama Space and Rocket Center. Approximately 130,000 visitors toured the facility in 1986.

HARDWARE TEST FACILITY

This site illustrates the Johnson Space Center's role in the testing necessary to ensure that astronaut equipment would operate safely in space and on the moon.

Space Environment Simulation Laboratory, Johnson Space Center

Built in 1965, this laboratory (common name--space environment simulator laboratory) man-rated and tested the integrity of the Apollo command module, service module, lunar module, hardware, and space suits under simulated space conditions. This testing was essential to the safety and well being of the astronauts.

The laboratory retains a high degree of integrity and is still in use. It receives a fair number of visitors in organized groups only. There is limited interpretive media on the site and none at the Johnson visitor center.

UNMANNED SPACECRAFT TEST FACILITIES

The following sites illustrate the extensive ground support testing needed for the American unmanned space program--the exploration of near and deep space. Both of these sites have contributed to the success of the unmanned space program and represent the technological sophistication necessary to accomplish that program.

Spacecraft Magnetic Test Facility, Goddard Space Flight Center

Built in 1966, this facility (historic name--attitude control test facility) is the only one of its kind in NASA's inventory. It determines and minimizes the magnetic movements of even the largest unmanned spacecraft and thereby eliminates unwanted torque resulting from the interaction of the spacecraft with the earth's magnetic field. The use and operation of this facility was and continues to be essential to the success of the American space program.

This test facility is currently being used, its structure and equipment are essentially intact, and it retains a high degree of integrity. It is several miles from the Goddard visitor center and main complex. It receives little visitor use and may be toured only in organized groups. Interpretive media includes informational signs and photographs at the entrance; they do not discuss the facility's importance to the Man in Space theme. There is no interpretive media about the facility at the Goddard visitor center.

Twenty-Five-Foot Space Simulator, Jet Propulsion Laboratory

The simulator was built in 1961 and is the only NASA facility capable of simulating true interplanetary conditions. Its test chamber can accommodate most modern spacecraft. In 1966 it was the first system of its type to use a collimating mirror to produce the intense solar radiation of space.

The simulator is still in active use; however, over the years only minor modifications have been made, and it retains a high degree of integrity. Few visitors, in organized groups only, have an opportunity to tour this site. Interpretive media includes informational signs and historic photographs of the simulator; they do not indicate the significance of this site. There is no visitor center at the Jet Propulsion Laboratory.

TRACKING STATION

This site illustrates the technology of communicating with manned and unmanned spacecraft. It was vital to the success of the early American space program.

Pioneer Deep Space Station, Goldstone Deep Space Communications Complex

Built in 1958, this was the first antenna to support the unmanned exploration of space. It tracked both unmanned and manned space missions and first demonstrated the technological achievements necessary to track deep space vehicles. Many of its design features were incorporated into later improved antennas at dozens of additional tracking stations around the world.

The site is currently inactive. Few modifications have occurred, and it retains a high degree of integrity. A fence and the dry desert air provide protection. The site is isolated and receives few visitors. It is not interpreted.

MISSION CONTROL CENTERS

These sites were critical to the early American manned and unmanned space programs.

Original Mission Control Center, Cape Canaveral Air Force Station

This mission control center was built in 1957 and was used for all Mercury flights and the first three Gemini flights. The center took over flight control when the rocket left the pad and maintained it through splashdown. In 1965 this function was transferred to the Johnson Space Center.

The center is in good condition and retains a high degree of integrity. The tour bus stops at the center, and a film, narrative tape, and lighted consoles are used to interpret the facility and its significance to the Man in Space story.

Space Flight Operations Facility, Jet Propulsion Laboratory

This site, built in 1963, illustrates the role of the Jet Propulsion Laboratory in the effort to explore the moon, planets, and solar system. Projects Viking, Voyager, Pioneer, Ranger, and Mariner opened new worlds for exploration and human understanding. The operations facility is the hub of a vast communications network that controls unmanned vehicles in space.

The site has been continually modified over the years to keep abreast technologically and accommodate new programs, but it continues to function as a control center and retains its overall original historic fabric. It is open to organized groups and receives a fair number of visitors each year. Visitors may view ongoing projects as personnel control the lighted monitors and screens. Interpretive media is limited, but a talk by on-site personnel explains the importance of this site. There is no visitor center at the Jet Propulsion Laboratory. An auditorium and exhibit area are open to organized groups. There is no interpretive media relating to the Man in Space story.

Apollo Mission Control Center, Johnson Space Center

This control center (common name--mission control center) was built in 1965 and provided flight control for nine Gemini flights and all Apollo flights. It was to Apollo mission control that Neil Armstrong reported his famous words that man had landed on the moon.

The center is an ongoing NASA facility and has been modified to accommodate space shuttle flights. Despite modifications, it continues to have a high degree of integrity. Large numbers of people visit the center in tour groups; however, they tour a mission control room on the second floor rather than the control room that was used for most Gemini and Apollo flights. The mission control center is part of the self-guided tour. Tours are regularly scheduled, and NASA personnel give talks in the control room that focus on existing programs, particularly the space shuttle. The Johnson visitor center provides brochures about the mission control center.

SUPPORT FACILITY

Rogers Dry Lake, Edwards Air Force Base

Rogers Dry Lake (historic name--Muroc Dry Lake) has been closely associated with the flight testing of advanced aircraft that opened the way to space. The natural attributes of clean air, ideal weather, isolated location, proximity to variable terrain, and a large dry lake bed provide a perfect environment in which to flight-test aircraft on the cutting edge of aviation and aerospace technology. From the Bell X-1 flight in 1947--the first plane to break the sound barrier--to the landing of the space shuttle Columbia in 1981, Rogers Dry Lake has been the scene of some of the most important events in aviation history.

Because of favorable climatic conditions, the dry lake retains its original integrity. Currently in use, the dry lake is integral to both Edwards Air Force Base and NASA's Dryden Flight Research Facility; the Air Force is responsible for the lake's management and maintenance. There are no formal tours of the lake bed; however, a limited number of organized tours are given. An overview of the lake and its significance is given at the nearby Jimmy Doolittle Airpark. Once a year the base hosts an open house of its facilities. There is no Air Force visitor center; however, NASA operates a visitor center that could provide media interpreting Rogers Dry Lake.

WIND TUNNELS

ROCKET ENGINE DEVELOPMENT FACILITIES

ROCKET ENGINE TEST STANDS

ROCKET TEST FACILITY

ROCKET

TRAINING FACILITIES

HARDWARE TEST FACILITY

UNMANNED SPACECRAFT TEST FACILITIES

TRACKING STATION

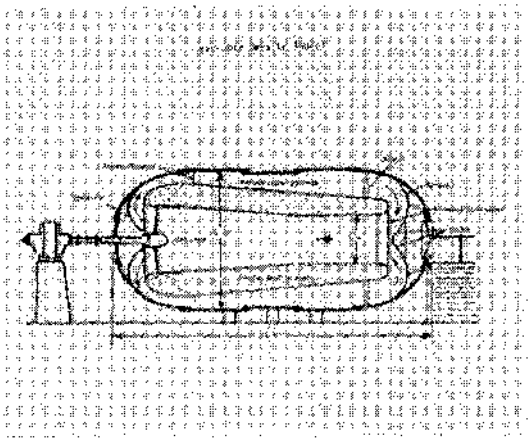
LAUNCH COMPLEXES

MISSION CONTROL CENTERS

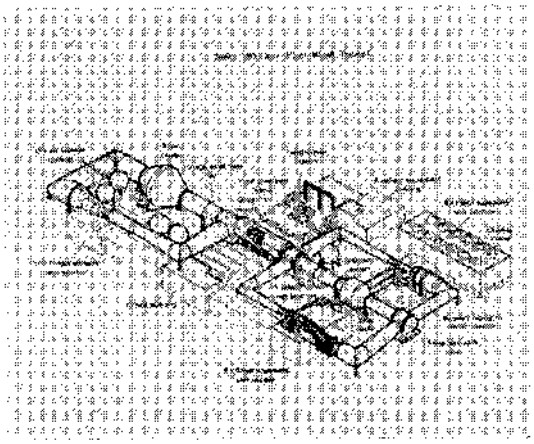
SUPPORT FACILITY

MAN IN SPACE SITES

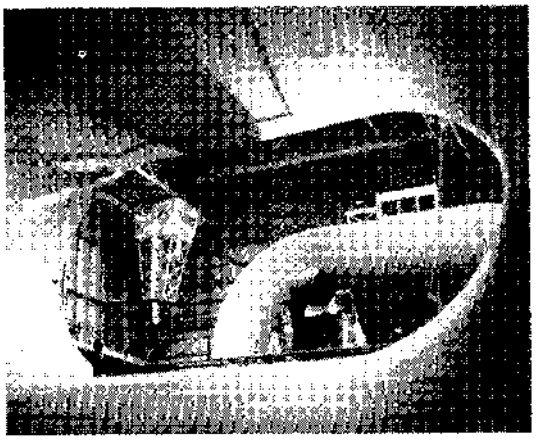
WIND TUNNELS



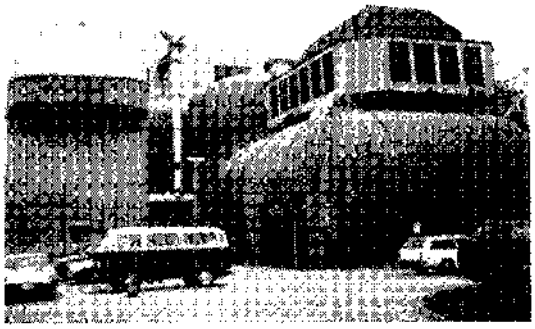
Variable density tunnel



Unitary plan wind tunnel

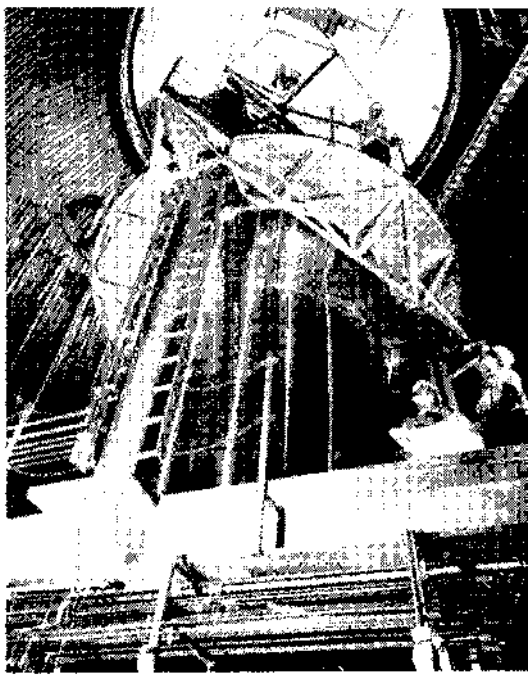


Full scale tunnel, Mercury space capsule testing



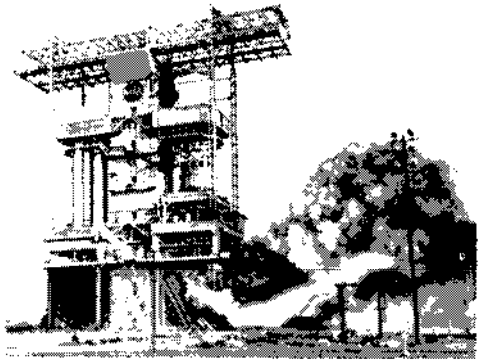
Eight-foot high speed tunnel, 1986

ROCKET ENGINE DEVELOPMENT FACILITIES

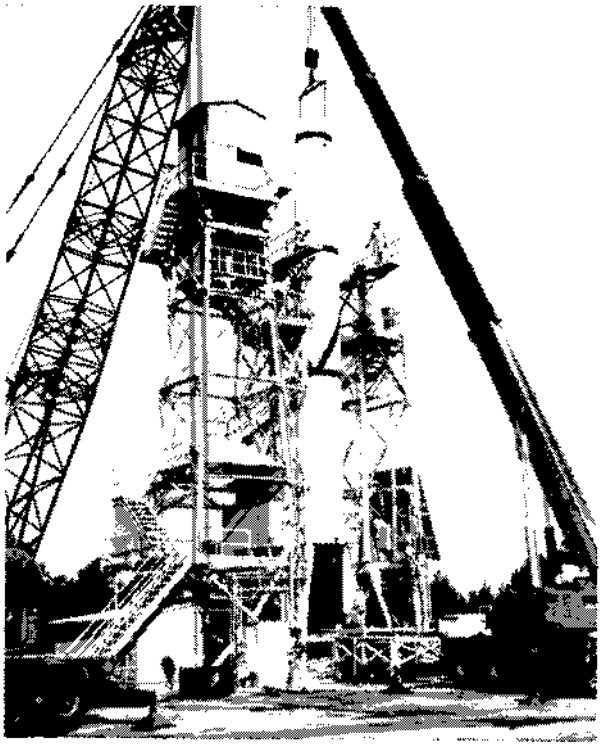


Spacecraft propulsion research facility, 1969

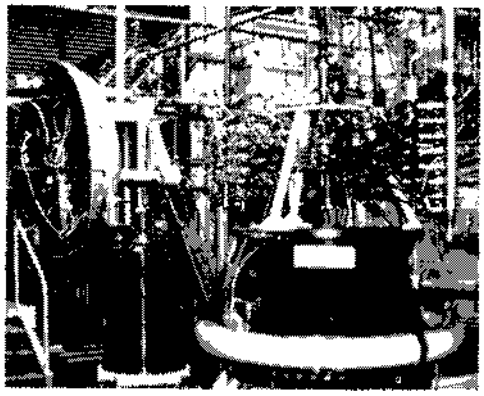
ROCKET ENGINE TEST STANDS



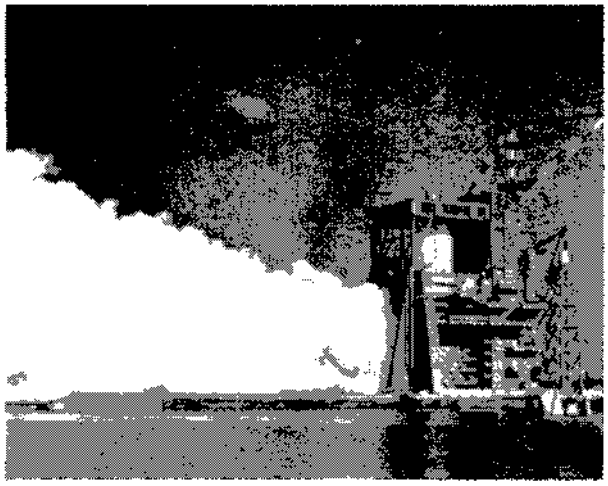
Propulsion and structural test facility, Saturn V F-1 engine testing



Redstone test stand



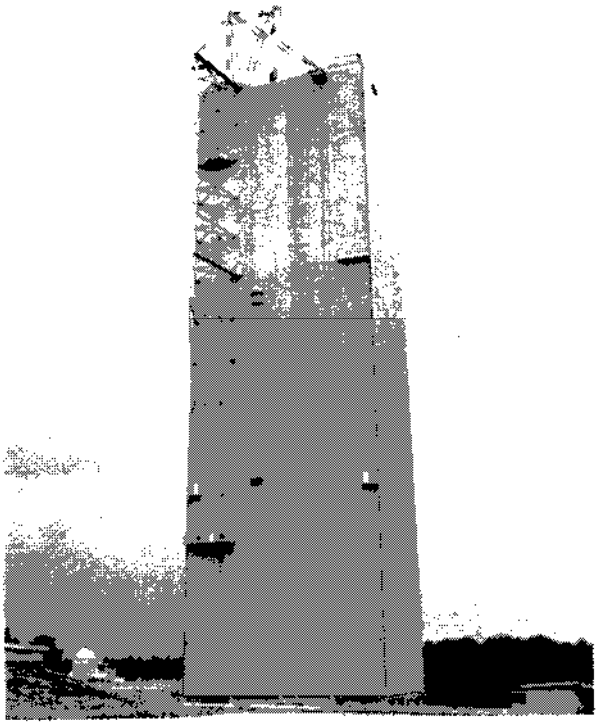
Rocket engine test facility, 1986



Rocket propulsion test complex, complex A-1

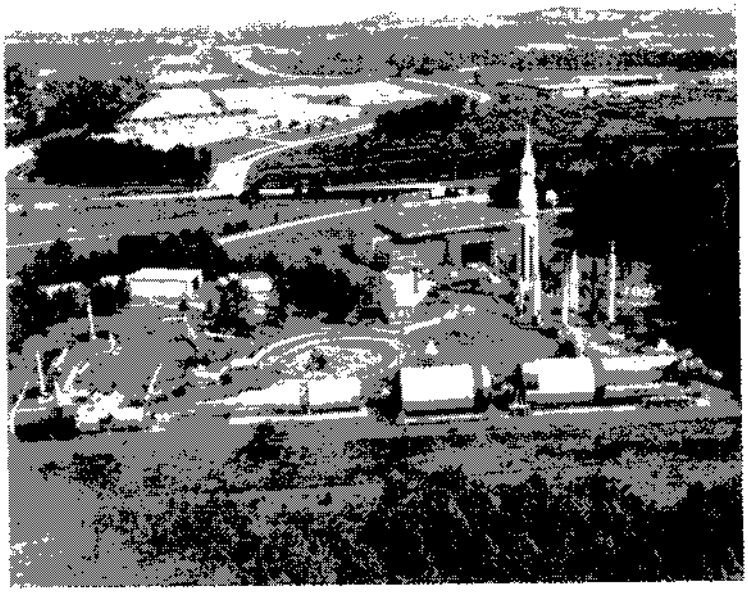
Zero-gravity research facility, 1966

ROCKET TEST FACILITY



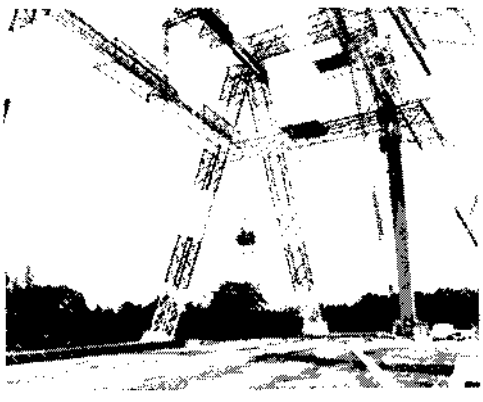
Saturn V dynamic test stand, 1971

ROCKET

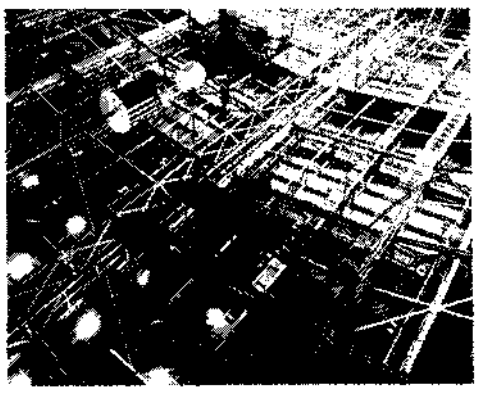


Saturn V space vehicle (before major additions to the Alabama Space and Rocket Center)

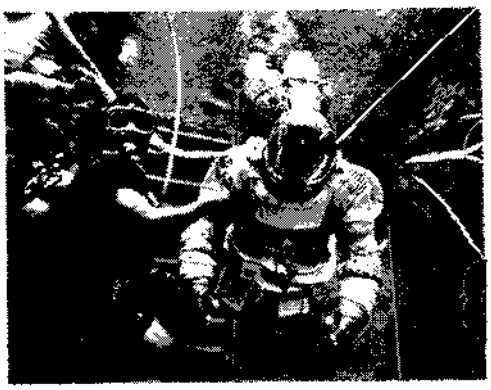
TRAINING FACILITIES



Lunar landing research facility, 1965

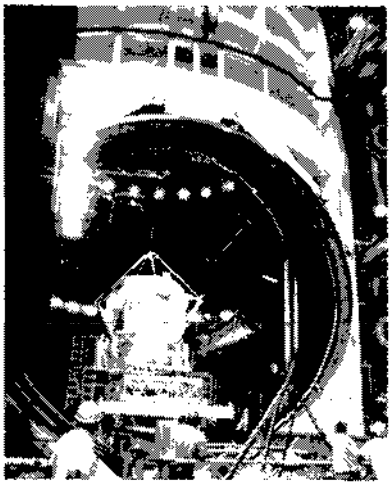


Rendezvous docking simulator before spacecraft, target, and analogue computer were removed



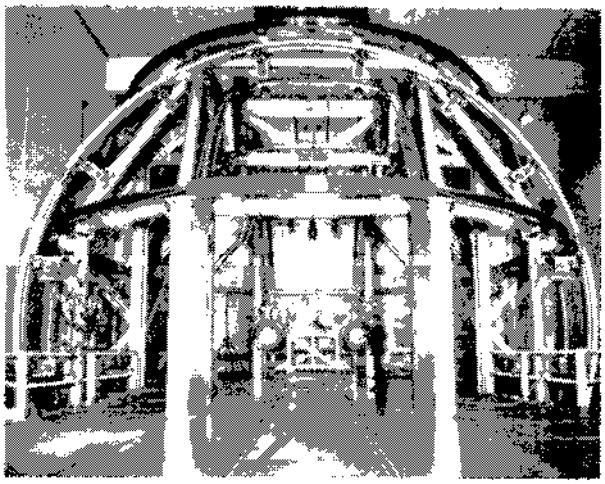
Neutral buoyancy space simulator, 1972

HARDWARE TEST FACILITY

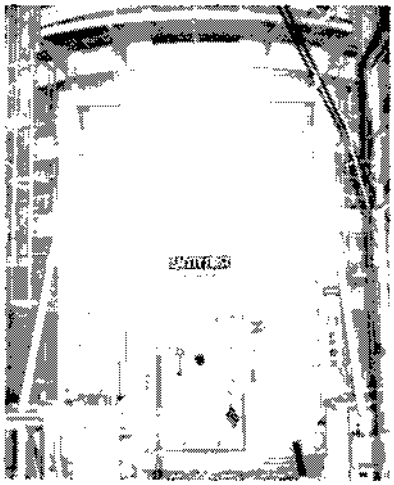


Space environment simulation laboratory, chamber A, 1971

UNMANNED SPACECRAFT TEST FACILITIES

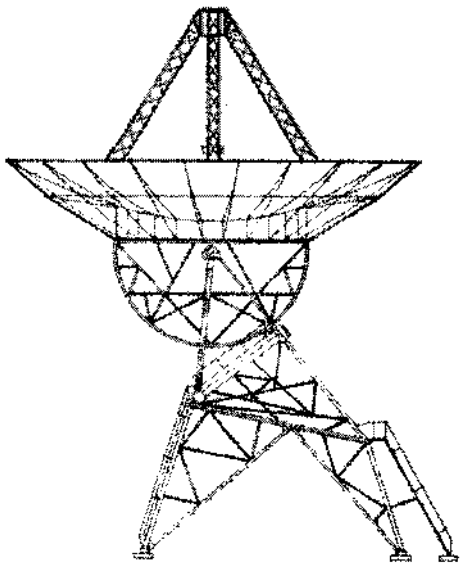


Spacecraft magnetic test facility, 1971



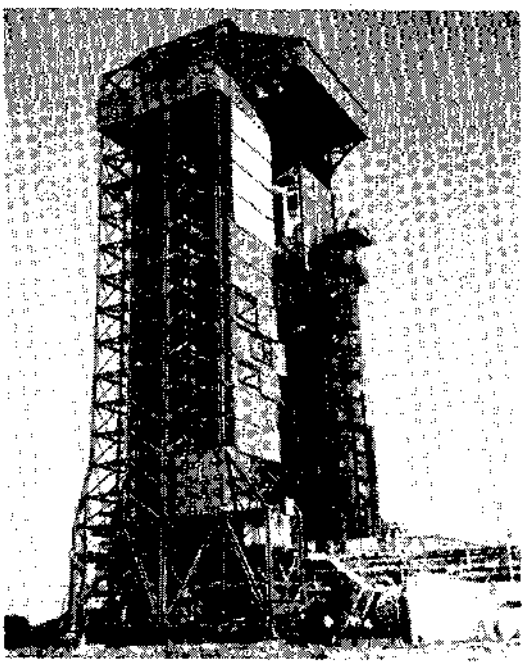
Twenty-five-foot space simulator, 1986

TRACKING STATION

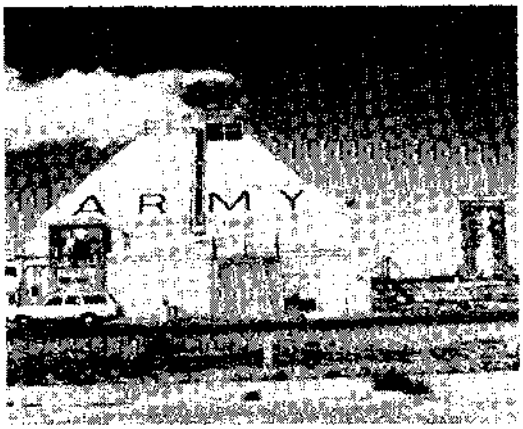


Pioneer deep space station

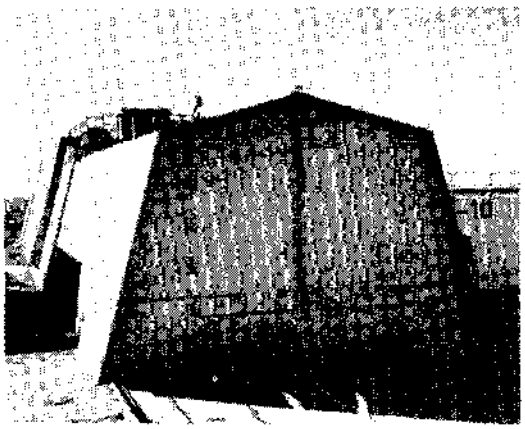
LAUNCH COMPLEXES



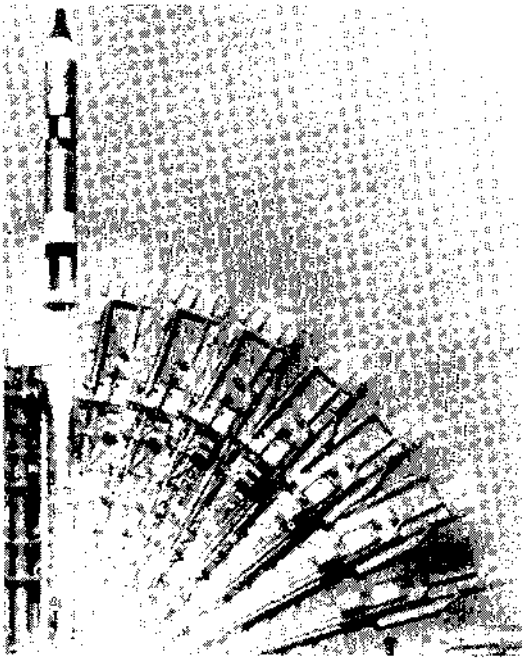
Complex 13 launch tower, 1986



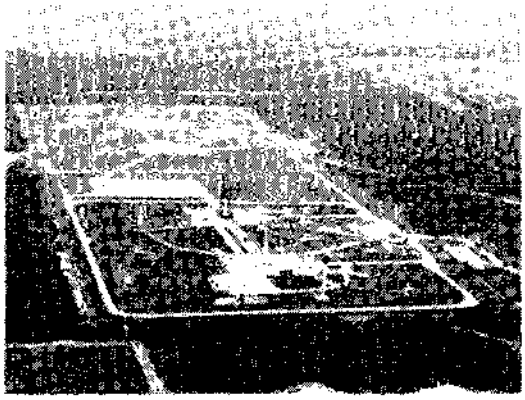
Launch complex 33, 1984



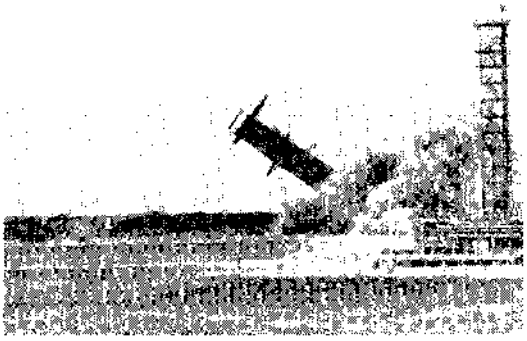
Space launch complex 10, 1987



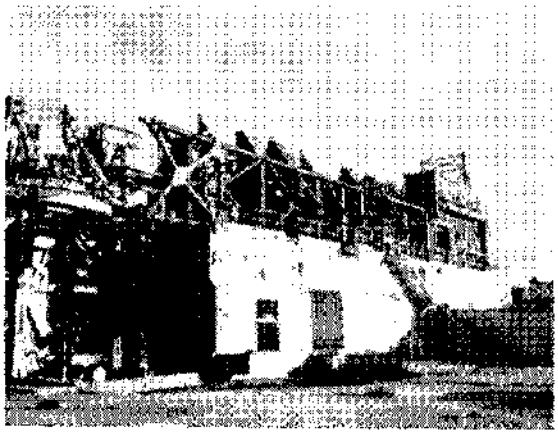
Complex 19, time-lapse photo of fold-back erector (service structure) and launch of Gemini/ Titan 2



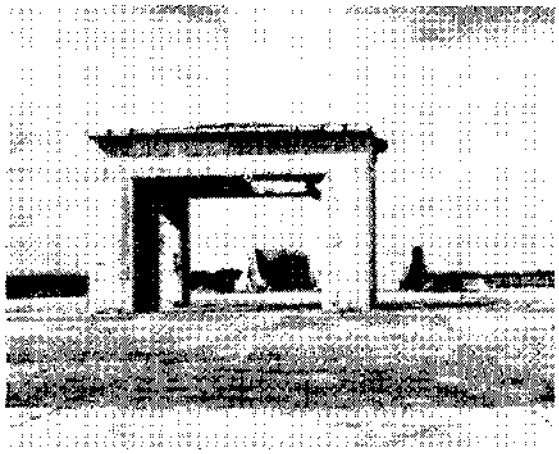
Launch complex 26, foreground, and complex 5/6, background, 1986



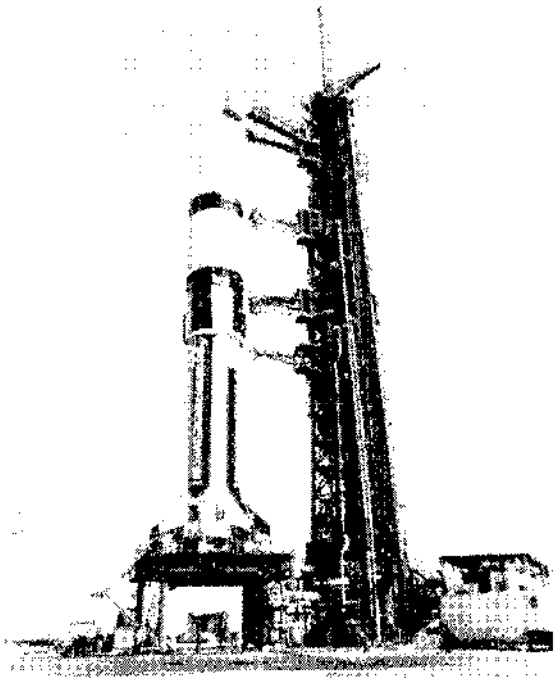
Complex 14, service structure demolition, 1976



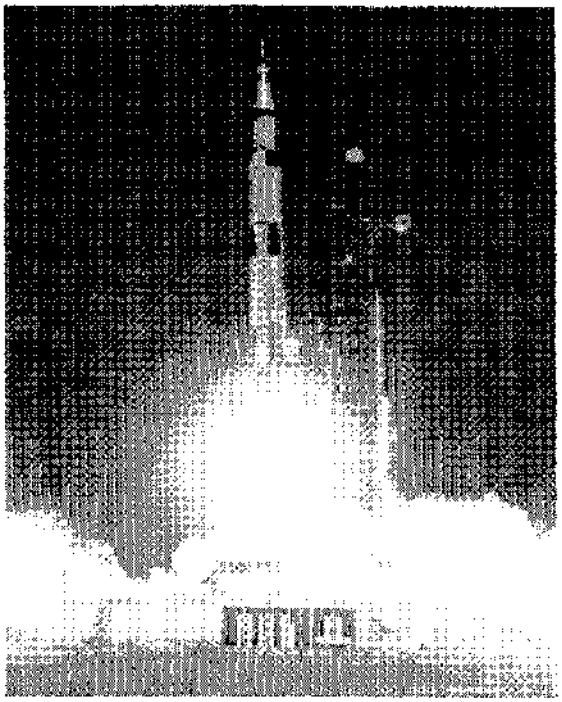
Complex 19, deteriorated fold-back erector (service structure), 1986



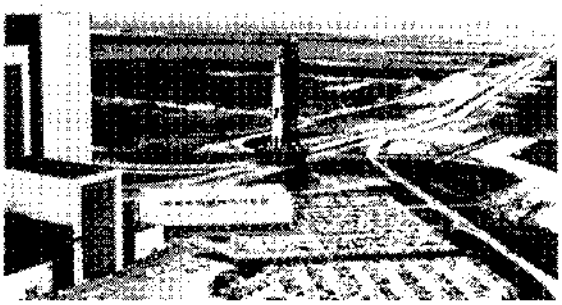
Complex 34, blast ring and blast deflector in background, 1986



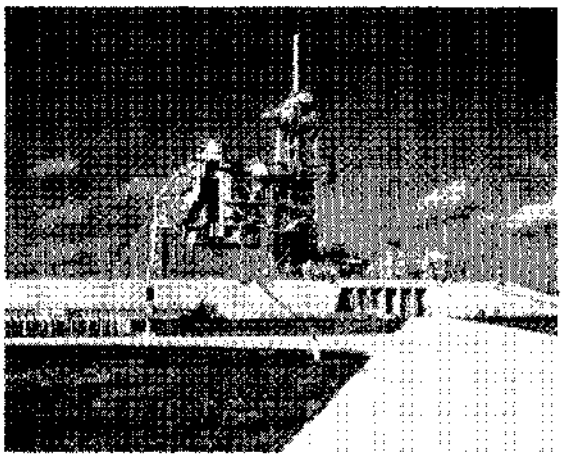
Complex 34, early checkout of Apollo 7/Saturn B space vehicle, 1968



Launch complex 39A, Apollo 11 taking man to the moon, 1969



Launch complex 39



Launch complex 39A, modified for shuttle program, 1986

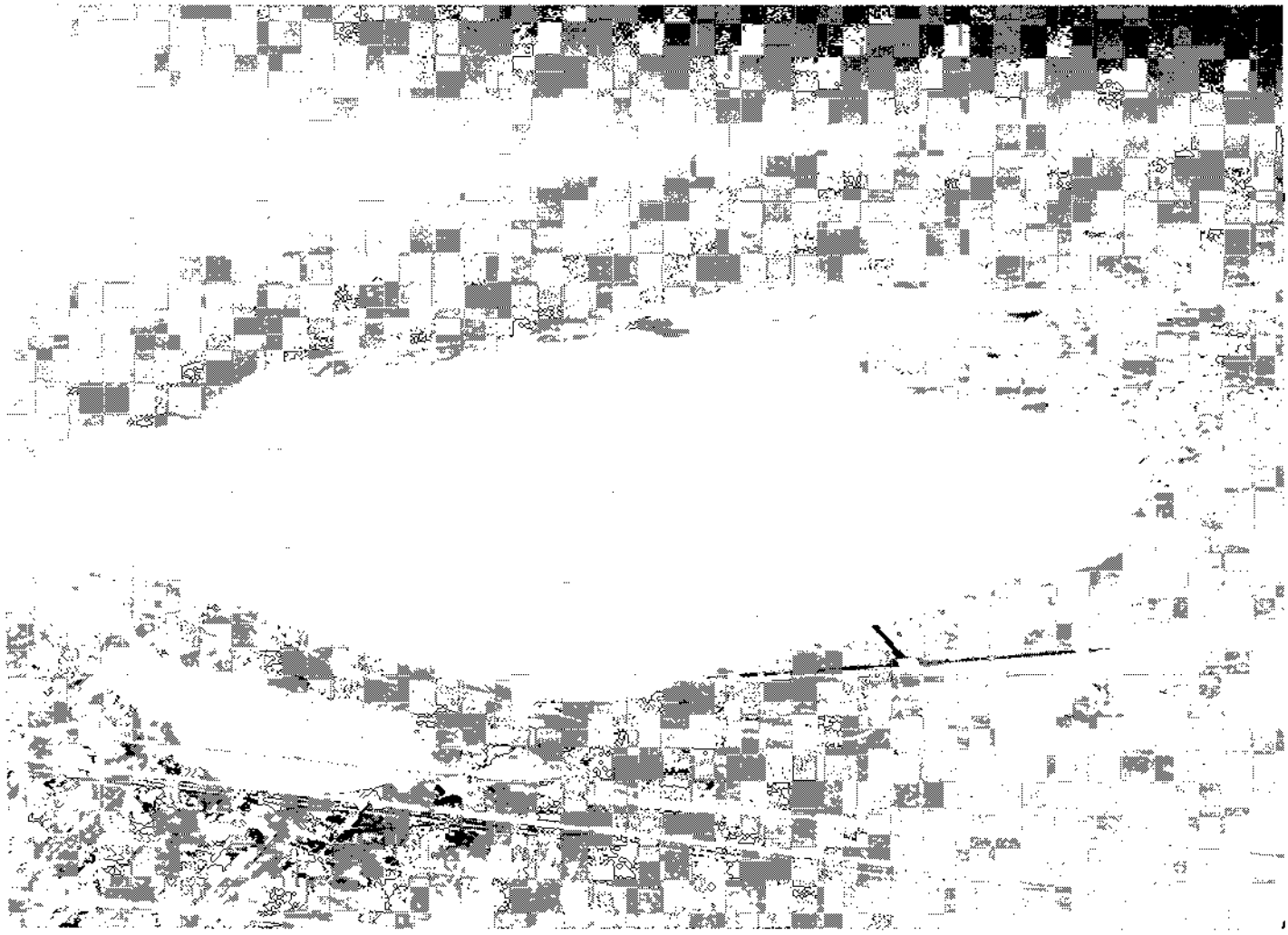
MISSION CONTROL CENTERS

Original mission control center, 1966

Space flight operations facility, Ranger VII flight monitoring, 1967

Apollo mission control center, third day of Apollo 8 mission, 1968

SUPPORT FACILITY



Rogers Dry Lake

INSTALLATIONS

The 18 installations that house the 26 Man in Space sites and supported various aspects of the early space program are administered by NASA, the Air Force, the Army, and the Alabama Space Science Exhibit Commission. As stated earlier, the Smithsonian does not house any of the Man in Space sites, but through its loan program several space artifacts are housed at the other installations. These installations are important to the Man in Space story because of their association with the early space program and because most of them currently provide interpretive/educational information through their visitor centers, organized tours, and/or teacher resource centers. Access to many of the Man in Space sites is highly regulated, so off-site interpretation at visitor centers or through other programs and media will be critical in relaying the Man in Space story to the public. The Alabama Space and Rocket Center and the Smithsonian's National Air and Space Museum are discussed here because the Alabama Space and Rocket Center houses one Man in Space site--the Saturn V space vehicle on loan from the National Air and Space Museum.

Each installation's role in the early American space program is described in the 1984 "Man in Space National Historic Landmark Theme Study." The following discussion is confined to the interpretive/educational programs at each installation as they relate to the Man in Space theme.

ALABAMA SPACE AND ROCKET CENTER

The Alabama Space and Rocket Center is adjacent to the Marshall Space Flight Center in Huntsville, Alabama. It serves as the official visitor information center for Marshall and is state-run and financed partly through private donation. An outdoor rocket park includes Apollo/Saturn V, Redstone, and Mercury/Atlas rockets and many others. The museum features an Apollo command module, Mercury spacecraft, and lunar-landing training vehicle. Other areas of the museum include a photo mural displaying important events in Wernher von Braun's life, illustrations of different types of technology developed for the space program, and hands-on exhibits. The center also contains the Spacedome Theater, featuring Omnimax films, a gift shop, and a fast-food cafeteria.

In 1982 the Space Camp program was implemented at the Alabama Space and Rocket Center to provide learning experiences in space history and technology. The highly successful program has continued to grow and is now a year-round program warranting its own newly built wing. Attendance for the 5-day 1987 program will reach 10,000.

The Alabama Space and Rocket Center utilizes Marshall as a part of its interpretive effort. It offers bus tours of nearby Marshall facilities and test sites where historic rockets were developed and tested and astronauts trained. There is little focus on the Redstone test stand,

propulsion and structural test facility, Saturn V dynamic test stand, and neutral buoyancy space simulator and their roles in the early American space program. The Saturn V space vehicle is adequately interpreted and its role in sending men to the moon is discussed. Approximately 400,000 people visited the center in 1986.

AMES RESEARCH CENTER, CALIFORNIA

Ames has no visitor center, but it does have a staging area for guided public tours (under contract) and a teacher resource center. Plans are underway to develop a visitor center with an auditorium and exhibits focusing on Ames' contribution to NASA's national space goal. Interpretation of the unitary plan wind tunnel is limited. Visitation at Ames in 1986 was 20,000.

CAPE CANAVERAL AIR FORCE STATION, FLORIDA

In 1966 the Air Force converted complex 26 into a space museum. The museum is funded by the Air Force Eastern Space and Missile Center. It was established by local personnel who realized the need for preservation and interpretation at Cape Canaveral. The Air Force Association (a private organization) provides volunteers who staff the space museum and interpret the Air Force's mission and history at the installation.

Currently, Air Force personnel conduct tours of Cape Canaveral for VIPs and organized groups. A bus tour of Cape Canaveral is available through the Spaceport USA visitor center. In addition, the Air Force has constructed kiosks that display historic photos and information at complexes 14, 19, 26, and 34. The kiosk at launch complex 26 is available to those on the bus tour; the remaining kiosks are open only to VIPs and organized groups. In 1986 approximately 85,000 people visited Cape Canaveral.

EDWARDS AIR FORCE BASE, CALIFORNIA

There is no visitor center at the base, but the newly opened Jimmy Doolittle Airpark displays Air Force aircraft that was tested at Edwards as well as a plaque designating Rogers Dry Lake as a national historic landmark. Visitors must obtain passes at the main gate to gain entry to Edwards. The airpark provides views of the dry lake. Public and VIP bus tours originating from the airpark are conducted on a periodic basis, and the base hosts an annual open house to familiarize visitors with their operation. Interpretive media is limited, and the current tour programs highlight existing and future programs. The Air Force is seeking a private entity to build and operate a visitor center at the airpark site. Visitor attendance in 1986 totaled 7,600 on tours and approximately 500,000 people at the open house.

GEORGE C. MARSHALL SPACE FLIGHT CENTER, ALABAMA

Marshall's visitor center and teacher resource center are housed in the Alabama Space and Rocket Center. The exhibitry provides information on Marshall's existing programs; it does not discuss the Redstone test stand, propulsion and structural test facility, Saturn V dynamic test stand, and neutral buoyancy space simulator. Interpretation of the Man in Space sites is provided on a bus tour of the Marshall facilities that originates from the Alabama Space and Rocket Center. Although the tour narrative highlights the sites, it does not explain their role in the early American space program and their importance to the first manned moon landing. The tour attracted over 131,000 people in 1986.

GODDARD SPACE FLIGHT CENTER, MARYLAND

The visitor center at Goddard is outside the facility gates, which permits unrestricted visitor access. It is currently undergoing redesign and updating of exhibits. The half of the center that has been redesigned features hands-on exhibits focusing on NASA's present achievements and future goals, such as the space shuttle, space station, and space research. The other half of the visitor center features prototypes and models of satellites and the Gemini XII spacecraft. The center also houses the teacher resource center. The spacecraft magnetic test facility is not interpreted. Renovation of the entire center will be complete within a year. Forthcoming exhibits will focus on Robert Goddard's significant work in aeronautics and rocketry. Visitors may also tour other Goddard facilities with guides; however, the spacecraft magnetic test facility is not a part of the regular tour and can only be visited by reservation. Over 73,000 people visited the center in 1986.

GOLDSTONE DEEP SPACE COMMUNICATIONS COMPLEX, CALIFORNIA

There is no visitor center at the complex, and no interpretive programs are offered. VIP tours may be arranged to the Pioneer deep space station.

HUGH L. DRYDEN FLIGHT RESEARCH FACILITY, CALIFORNIA

The Dryden visitor center is on the grounds of Edwards Air Force Base, and visitors must obtain passes at the main gate. The visitor center contains an auditorium, a gift shop, and a cafeteria. NASA personnel present a film and conduct tours of their facility twice a day. The film provides a historical perspective of the center's role in aviation and aeronautics, and the tours focus on existing and future programs.

Displays at the visitor center feature a model of the shuttle and exhibits of various aspects of the Apollo program. Exhibits of Rogers Dry Lake are displayed, and its importance to flight testing over the years is discussed. Approximately 25,000 people per year tour this facility.

JET PROPULSION LABORATORY, CALIFORNIA

There is no visitor center at the laboratory, but a small area inside the fenced installation contains exhibits, artifacts, and an auditorium that is open on a limited basis to tour groups. The teacher resource center provides educational information about JPL and NASA programs to educational institutions, civic and professional organizations, and the general public. Open houses are held on an irregular basis. Organized groups may visit several of the JPL facilities, including the space flight operations facility and the twenty-five foot space simulator. However, the Man in Space story is not adequately interpreted. Approximately 20,000 people visit the laboratory per year.

JOHN F. KENNEDY SPACE CENTER, FLORIDA

The space center contains the Spaceport USA visitor center operated by TW Services under contract with NASA. It contains two theaters, one of which is an IMAX facility, a museum, a gift shop, a cafeteria, a rocket park, and a sales and information area for tours of the Kennedy Space Center and Cape Canaveral. The museum, named the Gallery of Spaceflight, houses exhibits focusing on the Mercury, Gemini, and Apollo manned flights and other NASA programs. Exhibits contain artifacts of the space effort, such as the Gemini IX capsule and space suits. Approximately 2.2 million people visited Spaceport USA in 1986.

Two tours are offered for a fee--one of Kennedy, the other of Cape Canaveral. The bus tour of Kennedy stops at the Saturn V space vehicle and provides views of the vehicle assembly building, launch pads 39A and B, a crawler-transporter, and a mobile launcher. The bus tour of Cape Canaveral stops at launch complexes 5/6 and 26 and the original mission control center and passes numerous other launch sites and support facilities. The tour at the Kennedy Space Center focuses on the space shuttle program; the tour at Cape Canaveral highlights past and present programs. Neither tour adequately interprets the role of the Man in Space sites in the moon landing and the events leading up to that occasion.

LANGLEY RESEARCH CENTER, VIRGINIA

The Langley visitor center is operated under contract. It is inside the research center's gates, and nonmilitary personnel must obtain passes before entering. Two aspects of Langley research are interpreted--aeronautics and space. As at other visitor centers around the country, the interpretive focus is on existing and future programs and the Man in Space sites are not highlighted. Exhibits feature labeled photographs about the solar system, the evolution of aircraft, launch vehicle development, and wind tunnels. Artifacts include the Apollo 12 spacecraft and a Mercury test capsule used in unmanned research. Tours of the visitor center are offered. The visitor center has an auditorium, teacher resource center, and gift shop, and there are picnic tables and a

refreshment stand just outside. Group tours to other facilities at Langley, including the variable density tunnel, full scale tunnel, eight-foot high speed tunnel, and rendezvous docking simulator, can be arranged, and they are occasionally opened for general public viewing. In 1986 over 200,000 people visited Langley.

Langley is currently negotiating to move the visitor center outside its gates to a site in the city of Hampton. The city is promoting the move, with the cooperation of NASA. The new visitor center, proposed to open by 1990, will feature new exhibits.

LEWIS RESEARCH CENTER, OHIO

The visitor center at Lewis is inside the research center's gates, and people must obtain passes before entering. It is also operated under contract. The visitor center features a gift shop, a theater, a teacher resource center, and lectures in the evenings. Interpretive exhibits focus on the solar system, manned space program, rocket propulsion, and aeronautics. There are displays concerning the Mercury, Gemini, and Apollo projects, and Skylab 3 is exhibited. Interpretive media concerning the rocket engine test facility and the zero gravity research facility is limited. Tours of the visitor center are available for school groups and adult groups of 20 or more. One day a week the adult tours include stops at other Lewis facilities, including the Man in Space sites. In 1986 nearly 90,000 people visited the Lewis Research Center.

Preliminary negotiations are underway with the Cleveland Growth Association to move the visitor center out of the Lewis facility to a location in Cleveland. If this happens, exhibits are expected to change and become hands-on, reflecting present and future NASA achievements.

LYNDON B. JOHNSON SPACE CENTER, TEXAS

The Johnson visitor center is within the installation, and visitors must obtain passes. It includes a newsroom, a press television studio, an auditorium, and exhibit areas. Interpretive exhibits feature the history of the manned space effort. Artifacts include a lunar lander; Mercury, Gemini, and Apollo space suits; Mercury, Gemini, and Apollo spacecraft; moon rocks; and chronological displays of the manned space program. A teacher resource center is in the visitor center, and a cafeteria and gift shop are in a separate building. A rocket park, featuring a complete Saturn V, is nearby. A self-guided tour, including a brochure about other Johnson facilities, is offered. The Apollo mission control center is a part of this tour and may be seen on a reservation basis. Limited interpretive media about the mission control center and the space environment simulation laboratory is provided at the visitor center.

Plans are now underway, if financial backing can be obtained, to build a new visitor center outside the installation. The new center would be operated by a concessioner like the one at the Kennedy Space Center.

NATIONAL SPACE TECHNOLOGY LABORATORIES, MISSISSIPPI

This visitor center has exhibits focusing on the work conducted at the laboratories and a teacher resource center. Daily public and school tours of the test complex are offered under contract. The rocket propulsion text complex is interpreted at the visitor center, but its role in the early American space program is not explained. Visitor attendance in 1986 reached 90,000.

PLUM BROOK OPERATIONS DIVISION, OHIO

Most NASA facilities here, including the spacecraft propulsion research facility, are inactive or in standby status. There is no visitor center, and VIP tours must be arranged in advance.

SMITHSONIAN INSTITUTION, WASHINGTON, D.C.

The Smithsonian's National Air and Space Museum, which opened in 1976, features 23 exhibit areas focusing on aviation and space. Artifacts include aircraft and spacecraft, missiles, rockets, engines, propellers, space suits, uniforms, instruments, medals, and insignia, all of which contributed to the historical and technological achievements of air and space flight. The Apollo to the Moon Gallery features interpretive media and artifacts relating to the events leading up to the lunar landing. The Rocketry and Space Flight Gallery features exhibits on the history of rocket development. The Milestones of Flight Gallery features the Mercury spacecraft Friendship 7, Gemini 4 spacecraft, and Apollo 11 command module. The museum offers public tours, recorded tours, a planetarium, an IMAX theater, a cafeteria, a library, gift shops, archives, and an associate membership program.

As part of its artifact loan program, the museum has loaned Saturn V space vehicles to the Alabama Space and Rocket Center, the Johnson Space Center, and the Kennedy Space Center. Although the museum interprets aspects of the Man in Space theme, it does not focus on the 26 Man in Space sites or the strategic role they played in landing men on the moon. Approximately 7.4 million people visited the museum in 1986.

VANDENBERG AIR FORCE BASE, CALIFORNIA

Vandenberg Air Force Base has no visitor center. Approximately 50,000 visitors a year, primarily on group tours, come to the base. Few visitors except VIPs tour space launch complex 10. The base hosts occasional open houses, which attract 70,000-90,000 visitors.

Several volunteer groups are planning to rehabilitate space launch complex 10 for occasional public use and hope to begin planning for a visitor center.

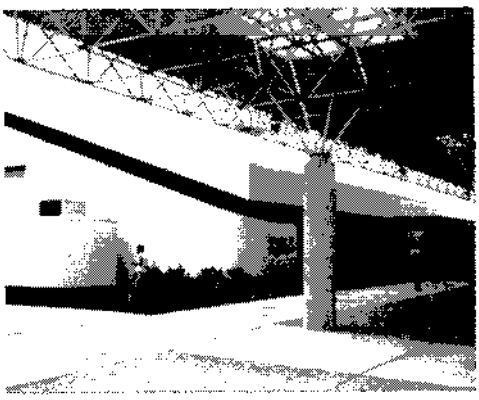
WHITE SANDS MISSILE RANGE, NEW MEXICO

The visitor center is inside the Army installation, and visitors must obtain passes. It contains a museum with interpretive displays and objects illustrating the history of White Sands. The center contains some information on launch complex 33 and its early role in rocket development. A static rocket display is approximately 1 mile from the visitor center. Attendance in 1986 exceeded 3,500 people.

INSTALLATIONS AND VISITOR CENTERS

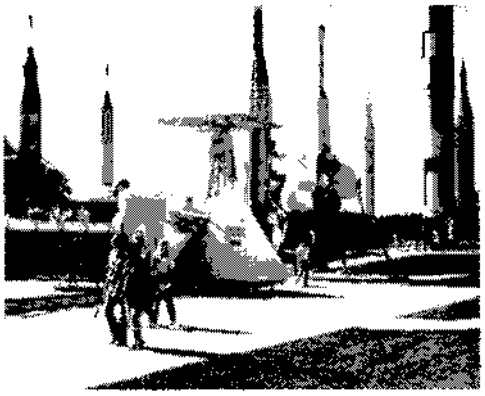
Marshall Space Flight Center

Visitor center at Langley Research Center



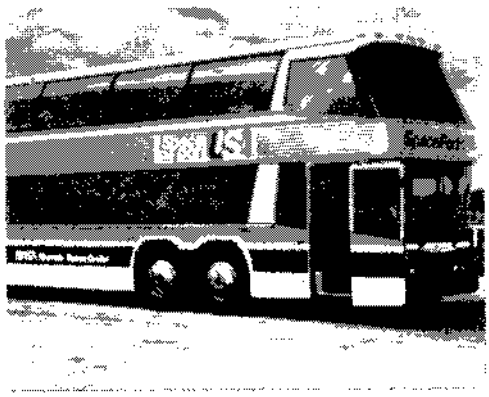
Gallery of Space Flight at Spaceport USA, Kennedy Space Center

OUTDOOR INTERPRETIVE MEDIA AND EXHIBITS



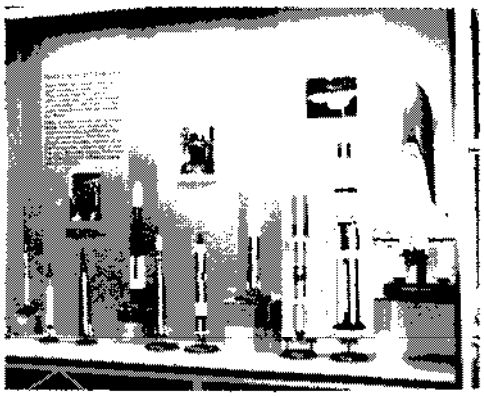
Rocket exhibit area, Kennedy Space Center

Entrance to launch complex 33, White Sands Missile Range

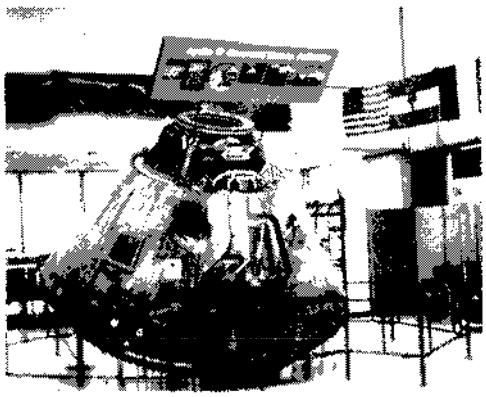


Spaceport USA bus tour, Kennedy Space Center and Cape Canaveral

VISITOR CENTER EXHIBITRY

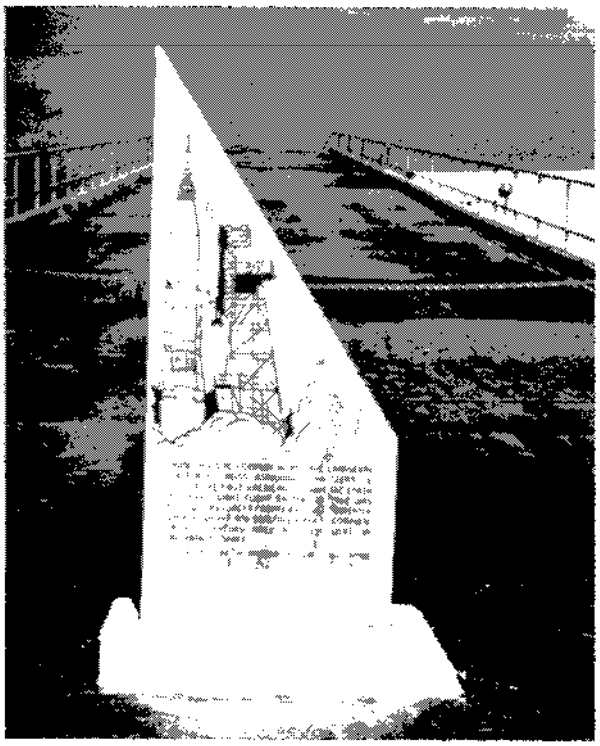


Langley Research Center



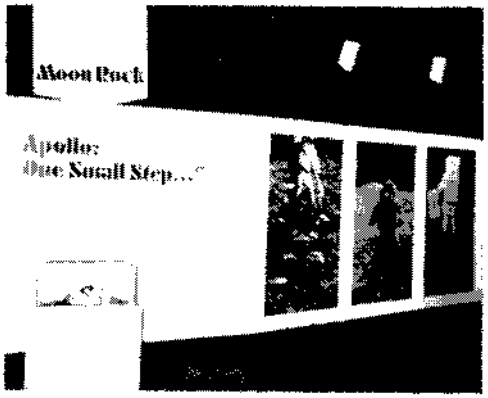
Johnson Space Center

Alabama Space and Rocket Center



Marker commemorating the first U.S. orbital flight by John Glenn, complex 14, Cape Canaveral

Goddard Space Flight Center



Gallery of Space Flight, Kennedy Space Center

OTHER SPACE MUSEUMS AND FACILITIES

The following areas do not contain any Man in Space sites; however, they possess a tremendous interpretive potential for telling the Man in Space story. Together with the Man in Space sites and installations, these areas can greatly increase public understanding and appreciation of the early American space program. It should be noted that this is not a list of all space museums and facilities in the United States.

CHICAGO MUSEUM OF SCIENCE AND INDUSTRY, HENRY CROWN SPACE CENTER, CHICAGO, ILLINOIS

This center was completed in July 1986 as a new addition to the Chicago Museum of Science and Industry. The museum focuses on historic, present, and future space programs. Objects on display include the Apollo 13 command module, a lunar lander, space suits, a moon rock, and numerous other artifacts. There are a large number of science exhibits and a 3-D space shuttle simulation. The center also features an OMNIMAX theater. Over 1 million people have visited the center since its opening in July.

KANSAS COSMOSPHERE AND SPACE CENTER, HUTCHINSON, KANSAS

This museum includes the space center, which contains interactive displays, and the Cosmosphere, a theater featuring aerospace films. The museum has the largest collection of space suits in the nation, and it works with NASA and the Smithsonian in the preservation and restoration of space artifacts. The 1986 visitation exceeded 350,000.

MICHIGAN SPACE CENTER, JACKSON, MICHIGAN

Housed in a geodesic dome, this museum features artifacts donated by five astronauts who are Michigan natives. The center features a theater, educational programs, and displays of space hardware. The 1986 visitation reached 45,000.

MUSEUM OF FLIGHT, SEATTLE, WASHINGTON

Located in a former Boeing warehouse, this museum contains exhibits on topics ranging from aviation to space and the future of NASA. New exhibit space is planned, with exhibits focusing on space technology. Attendance in 1986 reached 200,000.

NEIL ARMSTRONG AIR AND SPACE MUSEUM, WAPAKONETA, OHIO

This museum focuses on the life and achievements of the first man on the moon, Neil Armstrong. Historic artifacts include Armstrong's boyhood model airplanes and the Gemini 8 spacecraft. Operated by the Ohio Historical Society, the museum's 1986 visitation totaled 55,000.

OKLAHOMA AVIATION AND SPACE HALL OF FAME AND MUSEUM, OKLAHOMA CITY, OKLAHOMA

Aviation and space are this museum's themes, with exhibits featuring both airplanes and replicas of Mercury, Gemini, and Apollo capsules. Astronaut Thomas Stafford has donated many space hardware artifacts. The museum contains exhibit space, a research library, convention rooms, and a theater and is part of the Kirkpatrick Center. Visitation at the complex in 1986 reached 450,000.

ROSWELL MUSEUM, ROSWELL, NEW MEXICO

Robert H. Goddard's rocketry laboratory has been reconstructed at this museum, complete with original equipment. Other Goddard exhibits contain artifacts such as a complete rocket. The Roswell Museum is a municipal museum with a planetarium and art galleries. The 1986 attendance reached 45,800.

SAN DIEGO AEROSPACE MUSEUM, SAN DIEGO, CALIFORNIA

This museum originally opened in 1963, but was closed because of a fire in 1978 and relocated and reopened in 1980. It was the first aerospace theme museum to be accredited by the American Association of Museums. More than 70 aircraft and space objects are displayed. A space age exhibit honors man's exploration and achievements in space and includes full-scale replicas of the Apollo, Gemini, and Mercury command modules, space suits, and other astronaut memorabilia. The story of flight from Kitty Hawk through man's exploration of space is told. Approximately 250,000 people visited the museum in 1986.

SPACE CENTER, ALAMOGORDO, NEW MEXICO

The Space Center contains a museum, planetarium, OMNIMAX theater, and the International Space Hall of Fame. It features exhibits of space hardware and offers many educational and special programs. The fiscal year 1986 visitor attendance reached 196,000.

TITAN MISSILE MUSEUM, GREEN VALLEY, ARIZONA

This museum is the only site where visitors can tour a deactivated intercontinental nuclear missile and silo. The site honors Air Force crews who never fired a missile during war. Visitation since the museum's opening in May 1986 totals 19,000.

U.S. AIR FORCE MUSEUM, WRIGHT PATTERSON AFB, OHIO

This museum focuses on the role of the U.S. Air Force in moving from air into space, although most exhibits feature aircraft. Mercury, Gemini, and Apollo capsules are shown. The museum features tours, a theater, and guest lecture series and specializes in aircraft restoration. Over 1,100,000 people visited in 1986.

U.S. NAVAL AVIATION MUSEUM, PENSACOLA, FLORIDA

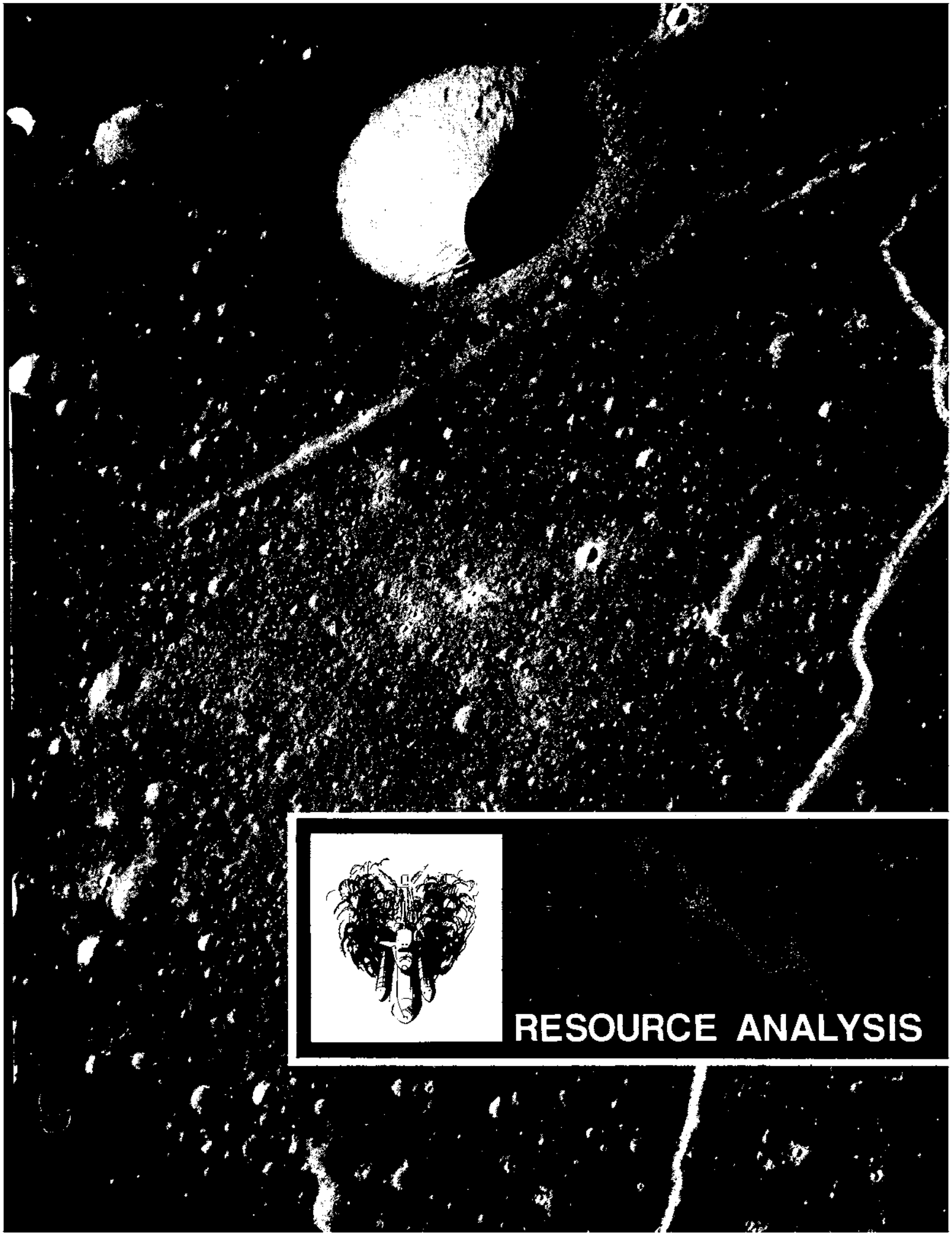
This museum traces the Navy's contribution to aeronautics and astronautics. It features a number of historic aircraft and spacecraft. The space age is represented by the Skylab 2 command module, which was launched in 1973 with an all-Navy crew of astronauts. In addition, there are more than 50 internal combustion and jet engines arranged to illustrate the chronological development of aircraft propulsion. It is estimated that over 200,000 visitors toured the museum in 1986.

WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, VIRGINIA

Wallops is a part of the Goddard Space Flight Center. The Wallops visitor center features exhibits focusing on milestones of flight, Wallops' contributions to these milestones, and future space programs. Also featured are a rocket park, an auditorium, guest lectures, a gift shop, and special programs. Attendance in 1986 exceeded 73,000.

WESTERN SPACEPORT MUSEUM AND SCIENCE CENTER, LOMPOC, CALIFORNIA (PROPOSED)

When completed, this development will include the spaceport museum, featuring interactive exhibits, multimedia presentations, working demonstrations of science and technology, and self-paced computer-driven learning environments, and the science center, providing high-quality information and an environment for the study of space-related issues and technologies. Administrators expect to attract up to 500,000 visitors during their first year of operation.



RESOURCE ANALYSIS

INTERPRETIVE/VISITOR USE POTENTIAL

One of the requests from Congress was that this Study of Alternatives prioritize the 26 Man in Space sites for permanent preservation, display, and interpretation based on historic significance, ease of public access, amount of visitation, and immediate and long-term costs. The following analysis ranks the sites according to their interpretive/visitor use potential based on the information presented in the "Resource Description" section and in the resource evaluation table in appendix E. The preservation potential of the sites is discussed in the next section.

For the purposes of this study, the Man in Space theme has been defined to include the events and technological developments from 1915 to 1972 that contributed to early manned spaceflight, the first manned moon landing, and subsequent lunar explorations as well as unmanned scientific exploration of the earth, planets, and solar system. As indicated in the overview of the "Resource Description" section, there were several significant and identifiable periods in the early American space program. To indicate what aspects of the program each site represents, the Man in Space theme has been divided into subthemes that correspond to the significant periods in the program. In addition, a series of key components have been defined that reflect the steps essential in any successful space launch and manned or unmanned flight. Together, these subthemes and components provided the basis for evaluating the interpretive potential of the sites and their installations. The subthemes are as follows:

Early Technological Developments, 1915-1958 - early efforts to develop a scientific and technological base for the study of flight. This began with the establishment of the National Advisory Committee for Aeronautics in 1915. In the following years the Army and Air Force as well as NACA established sites for the research and testing of airplanes and rockets. The period ended in 1958 with the establishment of NASA.

Innovation and Consolidation of Technological Developments, 1958-1961 - the period of space achievement beginning with the launching of the first U.S. space satellite and ending with America's first manned suborbital flight. This period also witnessed the preparations made by NASA for manned spaceflight, including reorganizing NACA and other government facilities and sites into the newly created NASA.

Man to the Moon, 1961-1969 - the period beginning when President John F. Kennedy committed the United States to landing a man on the moon and ending when that goal was accomplished. This period saw major portions of the Mercury, Gemini, and Apollo manned space programs successfully completed.

Moon Exploration, 1969-1972 - the period when the United States undertook a series of lunar flights and landings to collect additional

scientific information about the moon. The moon missions provided the world's scientific community with a vast amount of data including photographs, lunar samples, and accurate maps.

Scientific Exploration of Space - the efforts to launch and track unmanned space probes for purposes of research and exploration of the earth, planets, and solar system.

The following key components reflect the steps essential in any successful space launch and manned or unmanned flight:

Research/Development Testing
Equipment Assembly
Test Launch/Flight
Astronaut Training (if manned flight)
Manned or Unmanned Launch
Flight Control
Tracking/Communications

Table 1 displays and ranks the 26 sites and their installations according to their interpretive potential (as indicated by the number of subthemes and components of the Man in Space theme that each site represents) and their visitor use potential (as defined by the ease of access and the level of visitation). This table ranks the sites and their installations based on their ability to represent the Man in Space theme and to accommodate visitor use.

Table 1: Interpretive/Visitor Use Potential

INSTALLATIONS / Sites	INTERPRETATION: MAN IN SPACE THEME: Early Technological Developments 1915-1958	Innovation and Consolidation of Technological Developments 1958-1961	Man to the Moon 1961-1969	Moon Exploration 1969-1972	Scientific Exploration of Space	KEY COMPONENTS OF THEME: Research/Development Testing	Equipment Assembly	Test Launch/Flight	Astronaut Training	Manned or Unmanned Launch	Flight Control	Tracking/Communications	VISIT USE: Accessibility[1]
CAPE CANAVERAL AFS, FL.													
KENNEDY SPACE CENTER, FL.													
Launch Complex 39													
MARSHALL SPACE FLIGHT CENTER, AL.													
ALABAMA SPACE AND ROCKET CENTER													
Redstone Test Stand													
Propulsion & Structural Test Facility													
Saturn V Dynamic Test Stand													
Neutral Buoyancy Space Simulator													
Saturn V Space Vehicle													
SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM, WASHINGTON, D.C.[3]													
JOHNSON SPACE CENTER, TX.													
Space Environment Simulation Laboratory													
Apollo Mission Control Center													
LANGLEY RESEARCH CENTER, VA.													
Variable Density Tunnel													
Full Scale Tunnel													
Eight-Foot High Speed Tunnel													
Lunar Landing Research Facility													
Rendezvous Docking Simulator													
LEWIS RESEARCH CENTER, OH.													
Rocket Engine Test Facility													
Zero Gravity Research Facility													
EDWARDS AIR FORCE BASE, CA.													
(Dryden Flight Research Facility)													
Rogers Dry Lake													
WHITE SANDS MISSILE RANGE, N.M.													
Launch Complex 33													
GODDARD SPACE FLIGHT CENTER, MD.													
Spacecraft Magnetic Test Facility													
NATIONAL SPACE TECHNOLOGY LABS, MS.													
Rocket Propulsion Test Complex													
AMES RESEARCH CENTER, CA.													
Unitary Plan Wind Tunnel													
VANDENBERG AIR FORCE BASE, CA.													
Space Launch Complex 10													
GOLDSTONE DEEP SPACE COMMUNICATIONS													
COMPLEX, CA.													
Pioneer Deep Space Station													
JET PROPULSION LAB, CA.													
Twenty-Five Foot Space Simulator													
Space Flight Operations Facility													
PLUM BROOK OPERATIONS DIV., OH.													
Spacecraft Propulsion Research Facility													

1. Accessibility
   - Low – Restricted; no public tours
   - Medium – Restricted; public tours
   - High – Unrestricted

2. Visitation
   - Low – 0 to 75,000
   - Medium – 75,000 to 450,000
   - High – 450,000 and over

3. Although the Smithsonian National Air and Space Museum contains no national historic landmarks, its key role in displaying space artifacts and interpreting the Man in Space story, its ease of access, and the large numbers of visitors it attracts annually warrant a high ranking.

None
Low
Medium
High

PRESERVATION POTENTIAL

All of the 26 Man in Space sites are nationally significant. They have been placed into one of four groups indicating their preservation potential.

Group 1. The first group includes inactive sites that exhibit more than one of the following characteristics: they are considered to be threatened; they retain much of their original historic fabric; and they possess high interpretive and/or visitor use potential. They are listed alphabetically and not ranked in order of importance.

Apollo launch tower (dismantled), Kennedy Space Center
Launch complexes 5/6 and 26 and original mission control center, Cape Canaveral Air Force Station
Lunar excursion module (LEM), Langley Research Center
Pioneer deep space station, Goldstone Deep Space Communications Complex
Rendezvous docking simulator, Langley Research Center
Variable density tunnel, Langley Research Center

These sites should be preserved or restored to their original condition and made available for public use wherever possible.

Group 2. The second group consists of sites that are currently in active or standby status and exhibit both of the following characteristics: they retain some original historic fabric, and they possess relatively high interpretive/visitor use potential.

Apollo mission control center, Johnson Space Center
Full-scale tunnel, Langley Research Facility
Launch complex 39 (excluding dismantled Apollo launch tower above), Kennedy Space Center
Lunar landing research facility (excluding lunar excursion module above), Langley Research Center
Neutral buoyancy simulator, Marshall Space Flight Center
Propulsion and structural test facility, Marshall Space Flight Center
Rocket engine test facility, Lewis Research Center
Rocket propulsion test complex, National Space Technology Laboratories
Saturn V dynamic test stand, Marshall Space Flight Center
Spacecraft magnetic test facility, Goddard Space Flight Center
Spacecraft propulsion research facility, Plum Brook Operations Division
Space environment simulation laboratory, Johnson Space Center
Space flight operations facility, Jet Propulsion Laboratory
Twenty-five foot space simulator, Jet Propulsion Laboratory
Unitary plan wind tunnel, Ames Research Center
Zero-gravity research facility, Lewis Research Center

These sites do not need to be preserved or restored to their original condition to retain their significance or convey the Man in Space story, but section 106 and 110(f) compliance and documentation and recordation must be completed at a minimum. Depending on the nature of current activity and safety and security considerations, these sites could be made available for visitor use.

Group 3. The third group includes active and inactive sites that are not threatened because they are being adequately preserved.

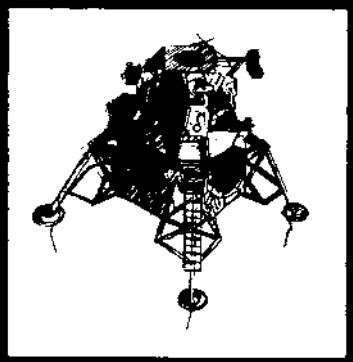
Launch complex 33, White Sands Missile Range
Redstone test stand, Marshall Space Flight Center
Rogers Dry Lake, Edwards Air Force Base
Saturn V space vehicle, Alabama Space and Rocket Center
Space launch complex 10, Vandenberg Air Force Base

These sites should continue to be preserved in place and interpreted to the public.

Group 4. The final group includes inactive sites that lack much of their original historic fabric but are still significant because of important events that occurred there.

Eight-foot high speed tunnel, Langley Research Center
Launch complexes 13, 14, 19, and 34 only,
Cape Canaveral Air Force Station

These sites can be allowed to further deteriorate, be demolished, or have their uses and functions changed if future programs warrant. Again, before any actions are taken, section 106 and 110(f) compliance and adequate documentation and recordation must take place. Off-site interpretation should be provided.



ALTERNATIVES AND IMPACTS

INTRODUCTION

The following alternatives have been identified as feasible ways of managing the 26 Man in Space sites and providing educational and interpretive opportunities to the public. Commemorating the landing of a man on the moon and the events leading up to that historic occasion is the focus of the alternatives. Visitor understanding of the overall Man in Space theme and how each site contributed to that theme is the primary objective to be achieved. The alternatives are conceptual and do not provide detailed strategies for management, interpretation, visitor use, and preservation. It is important to note that elements of one alternative can be combined with elements of another to develop the preferred course of action. Under any of the alternatives, the Kennedy Space Center and Cape Canaveral could be evaluated for possible nomination as a world heritage site because of the lunar landing's significance to mankind.

Two resources require some additional information before the alternatives are presented--the launch complex 26 service structure at Cape Canaveral and the Apollo launch tower at the Kennedy Space Center. As stated in the "Planning Concerns" section, the launch complex 26 service structure is badly deteriorated and its structural condition is questionable (1986 environmental assessment and preliminary case report by the Air Force). Before determining that it would be appropriate to preserve the service structure, an in-depth engineering feasibility study needs to be conducted to more precisely document its condition and structural integrity, its potential for restoration, and the costs for restoration and annual maintenance. Based on the results of the study, the following options could be explored: (1) total reconstruction to original condition, (2) restoration to a maintainable condition, (3) disassembly of components and shipment to appropriate visitor centers and museums for display, (4) disassembly and salvage, and (5) construction of a full-scale model using noncorrodible materials.

If fund-raising efforts for the Apollo launch tower were successful, the Apollo Society's proposal for reerecting the tower and establishing visitor use facilities adjacent to the Spaceport USA visitor center would be implemented. However if fund-raising efforts fell short of the $20 million goal, scaling back the proposal could be an alternative. One possibility would be to reerect the launch tower without the simulated launch pad 39B base, stationary landing platform, and Saturn V reproduction. Although there would be no exhibit areas or visitor services, visitors would be able to take elevator rides up the tower. Estimated cost would be approximately $8.5 million. Another idea would be to partially reerect the launch tower with a shortened reproduction of a Saturn V space vehicle. As with the first possibility, elevator rides would be provided. This option would cost approximately $3.5 million. Many other scenarios are possible depending on the success of fund-raising efforts. If fund-raising efforts were unsuccessful, an alternative to scrapping the tower would be to offer the disassembled sections to visitor centers and museums around the country for display.

With regard to fund-raising, July 20, 1989, will be the 20th anniversary of the first manned moon landing. Because this anniversary may prompt a national celebration, it could serve as a catalyst for fund-raising efforts to reerect the Apollo launch tower. The companies responsible for constructing the original launch pad base, launching platform, launch tower, and Saturn V space vehicle and for preparing men to go to the moon could be requested to donate money and services to reerect and construct the complex. The American people, who have lent support through the years, could be asked for donations to build the visitor facilities and interpretive media. Finally, other space memorials and projects throughout the country could benefit from association with fund-raising efforts for the Apollo launch tower project.

ALTERNATIVE 1 - CONTINUATION OF EXISTING MANAGEMENT

DESCRIPTION

Management, interpretation, visitor use, and preservation of the 26 Man in Space sites would continue under the direction of NASA, the Air Force, the Army, and other responsible organizations. The Smithsonian would continue to preserve and display space artifacts and loan them to other organizations. It is probable that interpretation would continue to focus on present and future programs rather than the early American space program and that funding for resource preservation would continue to be a low priority for most agencies. However, because the agencies' awareness of the importance of interpreting and preserving the Man in Space sites has increased as a result of the 1984 theme study and the subsequent landmark designation, more active interpretive and preservation programs might result.

Management

Current agency responsibilities for the Man in Space sites are as follows.

NASA. NASA manages 21 of the 26 sites; seven are inactive and 14 are active. The inactive sites receive varying levels of maintenance, and many have been salvaged. They are not currently used for agency programs and generally are not expected to be reactivated. Two notable exceptions are the Saturn V dynamic test stand and the spacecraft propulsion research facility, which could be reactivated. The active sites are currently used for agency programs and are modified or changed as necessary to meet new technological requirements and agency programs.

U.S. Air Force. The Air Force manages three of the 26 sites. The two inactive sites are currently used to support agency programs. The active site (Rogers Dry Lake) is naturally preserved and requires minimal maintenance.

U.S. Army. The Army manages one inactive site that has been restored and is not required for future agency programs.

Smithsonian Institution. The National Air and Space Museum collects, preserves, and displays aeronautical and spaceflight equipment of historical significance for educational purposes. The Smithsonian has loaned its Saturn V rocket to the Alabama Space and Rocket Center, which is responsible for maintenance and display.

National Park Service. The Park Service does not manage any Man in Space sites, but it was responsible for recommending the designation of 25 of the 26 sites as national historic landmarks.

Funding

Funding for interpretation, visitor use, and preservation of the Man in Space sites would probably remain a low priority for NASA, the Air Force, and the Army. Currently, few, if any, of the revenues from user fees and visitor services at their installations are expended on preservation. These monies are generally used to maintain the visitor facilities, not the resources. Interpretation, visitor access, and preservation are high priorities for the Smithsonian, but funding limitations do not permit them to assume major additional collection care activities.

Interpretation/Visitor Use

The 26 sites would continue to be interpreted by the managing agencies, and there would be little coordination of interpretive and visitor services related the Man in Space theme. The agencies would continue to focus their interpretive efforts on present and future programs rather than on the early American space program.

Most NASA visitor centers as well as other centers would continue to be operated by contract or concession personnel, agency personnel, and in some cases volunteers. The centers would expand and change exhibitry as appropriate, and new centers would be built as needed. There are preliminary plans between NASA and the local communities to move the Lewis and Langley visitor centers outside the fenced facilities to allow easier public access. There are also plans to build new visitor centers at the Johnson Space Center and the Ames Research Center. NASA teacher resource centers across the country would continue to assist educators in developing their aerospace education programs.

Although the Army and Air Force have no formal interpretive programs, their public affairs staffs and others would continue to conduct group tours of sites on a regulated basis and to open portions of their bases periodically to the public for activities like air shows and tours of designated sites. The Smithsonian's National Air and Space Museum would continue to promote better understanding of air and space through technological achievements. The Alabama Space and Rocket Center and other space museums and facilities would continue to display space objects and artifacts and interpret various aspects of the space program. Finally, media would continue to be devoted to current and future space programs, including movies (both conventional and IMAX/OMNIMAX), books, audio/video cassettes, magazines, television programs, and brochures/pamphlets.

Preservation

Preservation activities would probably continue to be limited. Of the 26 sites being studied, 10 are inactive and 16 are active. Five of the

inactive sites are no longer used, and only limited maintenance/ preservation monies are spent on them; the other inactive sites are maintained at a minimum level. The active sites are maintained, but few of them are being preserved as they existed during the early American space program because changes and modifications have been required to support new programs and technology. Many of the 26 sites were modified, salvaged, or abandoned without prior photographic, measured drawing, or historical documentation before they were designated to the National Register. The agencies are aware of the need to preserve the sites, but they have no priority system for preserving them. Some section 106 and 110(f) compliance work has occurred, but a more active compliance process involving the state historic preservation officer, the Advisory Council, and the agencies is needed to ensure that any actions undertaken have been adequately considered.

The Smithsonian's National Air and Space Museum has an active artifact loan program as part of its mandate to share collections and knowledge of those collections with the peoples of the world. However, funding constraints do not allow sufficient first-hand review of the conditions under which artifacts are exhibited at the borrowers' facilities or monitoring of the artifacts' state of preservation.

The Air Force has indicated that it does not have sufficient funds, in light of agency priorities, to rehabilitate and maintain the launch complex 26 service structure. (In 1985 the Air Force estimated that it would take $1.25 million to rehabilitate the structure and another $77,000 per year to maintain it.) If funds could not be obtained from other sources, the service structure would be dismantled as proposed.

To date, fund-raising efforts for reerecting the Apollo launch tower have been unsuccessful (cost $15 million to reerect the tower with mockup pad, mockup Saturn V rocket/command module, visitor facilities, and administrative offices and $5 million for cyclic maintenance). The Apollo Society might capitalize on the upcoming 20th anniversary of the first manned moon landing to attract private and public funds to complete their project. However, if fund-raising efforts continued to be unsuccessful, the Apollo launch tower might have to be scrapped.

IMPACTS

Management and Funding

There would be no impacts on existing management and funding under this alternative.

Interpretation/Visitor Use

Current interpretive and visitor services would not be directly affected; however, because most visitor center and interpretive programs focus on present and future space programs, the historical perspective would

continue to be fragmented and inadequately illustrated. Although the agencies might increase efforts to interpret the early American space program, there would be no national focus or comprehensive, coordinated effort in relating the Man in Space theme to the public. There would be no impacts on current visitor access policies.

Preservation

Preservation of the 26 sites would be hampered because of limited funding and low preservation priorities by the managing agencies. This would result in continued deterioration of inactive sites and inadequate documentation of altered sites. The launch complex 26 service structure at Cape Canaveral would likely be dismantled because of the concerns discussed in the Air Force's environmental assessment and preliminary case report. Efforts to reerect and preserve the Apollo launch tower would depend on the success of fund-raising; if it proved unsuccessful, the tower might have to be scrapped.

ALTERNATIVE 2 - EXPANDED AGENCIES ROLE

DESCRIPTION

The major distinction between this alternative and alternative 1 is that NASA, the Air Force, and the Army would have more responsibility for the provision of interpretive and visitor services focused on the Man in Space theme. Congressional action would be required to establish a new funding base that would permit the agencies to hire additional personnel to carry out interpretive activities and resource documentation and recordation at the Man in Space sites.

The emphasis under this alternative would be on interpreting the Man in Space theme through a wide variety of off-site media, including movies, exhibits, displays, and publications. Visitor access to the sites would not be stressed. Each agency would interpret the overall Man in Space theme and then highlight individual site contributions to the first manned moon landing and the events leading up to that achievement. The use of contract, concessioner, and volunteer personnel would be explored wherever possible. If requested, the Park Service could provide general guidance in interpretive efforts to ensure that programs were presented in a comprehensive, coordinated, and consistent manner. The Smithsonian could provide assistance in preserving and displaying space artifacts as well as providing artifacts through their loan program.

Management

NASA, the Air Force, and the Army would more actively manage and interpret the significance of the Man in Space sites and installations. Interpretation of the Man in Space theme would be carried out at installation visitor centers, through visitor programs, and in some cases at the sites. Sites and installations with the highest interpretive/visitor use potential (as identified in the "Resource Analysis" section) would receive priority management consideration in providing interpretive media and visitor services. Sites with the highest preservation potential would be given priority consideration if monies were made available for selected preservation projects, but the provision of interpretive and visitor services would be the most important factor in management decisions about the sites.

Funding

A new funding base and authority to hire additional personnel would be established by Congress for NASA, the Air Force, and the Army. This authorization would also include funds to permit technical assistance by the Park Service and Smithsonian and to allow the Smithsonian to devote more time to preserving the space artifacts related to the Man in Space theme. In addition to congressional appropriations, user fees could be established or increased, fund-raising and donations could be encouraged,

and income from visitor services could be earmarked primarily for interpretation.

Interpretation/Visitor Use

Interpretation of the 26 sites would be decentralized and the responsibility of each agency. The primary emphasis would be on the early American space program and site contributions to that program. Each agency would prioritize their Man in Space sites according to their interpretive/visitor use potential and would prepare an interpretive plan that would include types of off-site media appropriate to each site and installation, major subthemes and components that would be presented to the public, written and photographic sources, and types of exhibitry/displays and signs to be used.

The managing agency would determine what levels and types of access would be appropriate for each site. Off-site interpretation would be emphasized, but visitor access to the sites would be provided where feasible. If requested, the Park Service and the Smithsonian could provide technical assistance and work jointly with the agencies in developing a comprehensive interpretive plan for all of the sites. Pamphlets, books, film, exhibits, and displays illustrating the Man in Space theme could be distributed to other space museums and facilities.

Preservation

Each agency would prioritize their sites based on preservation potential and would work closely with the Advisory Council and state historic preservation officers in documenting and recording the sites in compliance with the section 106 and 110(f) implementing procedures. This documentation would be completed before any sites were further altered.

The launch complex 26 service structure would likely be dismantled; however, mitigating measures including proper documentation/recordation and offering the tower to an interested museum would be undertaken. The possibilities for the Apollo launch tower would be the same as those discussed in the introduction to the alternatives.

IMPACTS

Management and Funding

The agencies would have more responsibility for interpretation and provision of visitor services at the 26 sites. The new funding base and authorization to hire additional personnel would minimize financial/manpower impacts and avoid the need to compete for existing funds and personnel.

Interpretation/Visitor Use

If the Park Service and/or the Smithsonian provided the interpretive framework, the Man in Space theme would be more comprehensively and consistently interpreted than at present. Current interpretation, which focuses on present and future space programs, would be enhanced because of the introduction of a historical context. Off-site interpretation would be greatly improved; on-site interpretation would remain the same or would decrease. There would be few impacts on current visitor access policies.

Preservation

Agencies would be required to comply with section 106 and 110(f). However, because the focus would be on off-site interpretation, extensive preservation measures (stabilization, restoration, or reconstruction) would probably not be undertaken. The impacts on the launch complex 26 service structure and Apollo launch tower would be the same as under alternative 1.

ALTERNATIVE 3 - FOUNDATION OR COMMISSION COORDINATION

DESCRIPTION

Responsibility for interpretation, visitor use, and preservation of the 26 Man in Space sites would be centralized under a private foundation or public commission established to oversee, coordinate, and direct interpretive and preservation efforts nationwide. This would permit coordinated and consistent interpretation at all sites, installations, and other museums and facilities as well as selected site preservation projects.

More emphasis would be placed on on-site interpretation and resource preservation; off-site interpretation at installation visitor centers would also continue to be important in telling the Man in Space story. Congress would authorize and provide funding for the foundation or commission and would also designate the 26 Man in Space sites as affiliated areas of the national park system (not a national park system unit). The areas would receive special recognition and could draw upon Park Service and Smithsonian technical assistance in interpretive and preservation efforts. Depending on the level of assistance, an additional appropriation from Congress might be necessary. Private sector contributions would also be sought to supplement congressional appropriations in supporting foundation or commission activities. Cooperative agreements between each agency and the foundation or commission would be established to ensure proper interpretation and preservation of the Man in Space sites. Contract, concessioner, and volunteer services would be used wherever possible.

Management

The Man in Space sites would remain under the administration of their respective agencies; the legislation authorizing the foundation or commission would define its role and responsibilities in interpretation, visitor use, and preservation of the sites. Administrative offices for the foundation or commission would be in Washington, D.C., where each agency's headquarters is located, to assure a national focus for the 26 sites.

The foundation or commission would work with the involved agencies, advise them regarding interpretive and preservation concerns, and oversee operations related to the sites. Taking into account each agency's mission, the foundation or commission would prioritize the sites, recommend specific measures for their interpretation and preservation, and provide a comprehensive interpretive plan for presenting the Man in Space theme to the public. In addition, it would work with federal, state, local, and private agencies, groups, and individuals to encourage interpretation of the Man in Space theme nationwide.

Funding

Additional funding and authority to hire personnel would be provided to the foundation or commission through congressional action. The foundation or commission would in turn fund the interpretive and preservation activities of the administering agencies related to the Man in Space theme. Funding for foundation or commission activities and for interpretive and preservation efforts would also be raised through private fund-raising, corporate donations, sales from visitor services, and possibly increased visitor fees. The foundation or commission would support all fund-raising activities, including the activities of the Apollo Society for the preservation of the Apollo launch tower.

Interpretation/Visitor Use

An interpretive plan would be developed by the foundation or commission in cooperation with all of the managing agencies. The plan would assess the need for on-site interpretation at the 26 sites and would recommend appropriate media for both on-site and off-site interpretation. An overview of the Man in Space theme would be presented at each of the sites as well as site-specific information describing its individual contributions to the early American space program. The foundation or commission would provide guidance and technical assistance, including determining the interpretive subthemes/components and the types of historical and photographic sources, exhibitry, displays, and other media to be used, developing a logo and coordinated sign system, and possibly developing a traveling exhibit. It would provide assistance in developing interpretive media and programs once the Apollo launch tower and its associated visitor facilities were constructed. It would also coordinate and work with personnel at other space museums and facilities to ensure consistency of themes, subthemes, media, and materials nationwide. Visitor use would continue to be regulated by the managing agencies.

Preservation

Allocation of funds would be based on each site's preservation potential. Documentation and recordation according to section 106 and 110(f) implementing procedures would be required for each property. Agencies would not be prevented from salvaging all or portions of existing facilities unless site preservation was considered essential to interpretation; however, proper documentation would be required before any property was altered. The foundation or commission along with the appropriate state historic preservation officer and the Advisory Council would be notified of the nature of all alterations. The foundation or commission and the agencies would use contract and volunteer personnel wherever possible in the preservation and maintenance of sites. The agencies would receive guidelines and technical assistance from the foundation or commission in preservation activities.

The options described in the introduction to the alternatives for preserving the launch complex 26 service structure (if determined feasible) and reerecting the Apollo launch tower would be explored. Members of the foundation or commission would lend expertise in the fund-raising effort to reerect the tower as a part of the 20th anniversary of the first manned moon landing.

IMPACTS

Management and Funding

Guidance and assistance from the foundation or commission would help the managing agencies coordinate and interpretive and preservation activities related to the Man in Space resources. The new funding base and authority to hire additional personnel would minimize financial and manpower impacts on managing agencies and avoid the need to compete for existing funds and personnel. The cost of certain visitor services could increase.

Interpretation/Visitor Use

This alternative would result in coordinated interpretation and increased visitor understanding of the Man in Space theme. Current interpretation, which focuses on present and future space programs, would be enhanced because of the introduction of a historical context. On-site interpretation and visitor access would increase.

Preservation

Coordination of preservation efforts would mean that all properties would be prioritized based on their preservation potential, and selected sites would be stabilized, restored, or reconstructed as funds were made available. All sites would be documented and recorded under section 106 and 110(f) implementing procedures. The launch complex 26 service structure would be preserved, if determined feasible by the engineering study. The Apollo launch tower would be preserved, assuming fund-raising efforts were successful.

ALTERNATIVE 4 - NATIONAL PARK SERVICE DIRECTION

There are two options for implementing this alternative. Under option A a new national park system unit would be established at Cape Canaveral and the Kennedy Space Center to commemorate the first manned moon landing and the events leading up to that achievement. The new unit--America in Space National Historical Park--would provide a focus for interpretation of the Man in Space theme and preservation of resources. It would include launch complexes 5/6 and 26 and the original mission control center at Cape Canaveral and the Apollo launch tower at the Kennedy Space Center, and the Park Service would assume on-site management responsibilities for these resources. The remaining Man in Space sites would be designated as affiliated areas of the national park system (not a national park system unit), and the Park Service would enter into cooperative agreements with the managing agencies to direct, coordinate, and provide technical and financial assistance in their preservation and interpretation activities. Contract, concession, and volunteer personnel would be used wherever possible to carry out these activities.

Under option B all of the Man in Space sites would be designated as affiliated areas of the national park system. The Park Service would not directly manage any of the areas, but through cooperative arrangements, it would be responsible for directing, coordinating, and funding interpretive and preservation activities related to the Man in Space theme. This approach would provide coordinated and consistent interpretation and adequate site preservation. New legislation would be needed to provide funding and define the Park Service role and responsibilities. Again, contract, concession, and volunteer personnel would be used in interpretive and preservation activities.

OPTION A

Management

The new national park system unit would consist of launch complexes 5/6 and 26 and the original mission control center at Cape Canaveral and the Apollo launch tower at Kennedy. The Park Service would assume on-site management responsibilities including preservation, maintenance, and interpretation at these locations. The Park Service would enter into cooperative agreements with the other agencies to provide technical and financial assistance at the Man in Space affiliated areas as well as direction and coordination in interpretive and preservation activities. Park headquarters would be in the vicinity of Cape Canaveral and the Kennedy Space Center. Existing building space might be used for both administrative and visitor use functions. After the Apollo launch tower was reerected, the Park Service might contract with another party to manage the site or it might provide on-site management.

Funding

There are several ways that funds could be obtained: The new unit could be funded through a line-item appropriation in the NPS budget, which would be in addition to existing funds; user fees could be added for tours of the national historical park and the Man in Space affiliated areas to recoup the costs of interpreting and preserving the sites; sales and rental fees could be charged for interpretive materials and specialized visitor services relating to the Man in Space theme; and fund-raising efforts and corporate donations could be emphasized.

Although funding would be directed at the national historical park, funds would also be provided to the Man in Space affiliated areas. No preservation funds would be provided for active sites, except to assist in section 106 and 110(f) compliance. The Park Service would actively participate in and provide direction for fund-raising efforts by the Apollo Society to reerect the Apollo launch tower.

Interpretation/Visitor Use

An interpretive plan would be developed by the Park Service in cooperation with the other managing agencies. The plan would assess the need for on-site interpretation at the historical park and affiliated areas and would recommend appropriate media for both on-site and off-site interpretation. An overview of the Man in Space theme would be presented at each of the sites as well as site-specific information describing its individual contributions to the early American space program.

Interpretation focusing on launch complexes 5/6 and 26, the original mission control center, and the Apollo launch tower would be provided at the new historical park by on-site NPS personnel, concession, contract, or volunteer personnel, or a combination of the above. The Park Service would provide guidelines and recommend scripts to concessioner personnel for the bus tours at the Kennedy Space Center and Cape Canaveral, particularly launch complexes 13, 14, 19, and 34 at Cape Canaveral and launch complex 39 at the Kennedy Space Center. Information, interpretation, and visitor services related to the Man in Space theme could be provided at the Spaceport USA visitor center or at a separate visitor contact facility. If a separate visitor contact facility was determined necessary, it could be near launch complexes 5/6, 26, the original mission control center, or the Apollo launch tower or outside the Kennedy Space Center and Cape Canaveral to permit unrestricted access at all times.

Interpretation at the affiliated areas would be accomplished through cooperative agreements between the Park Service and the other managing agencies and organizations, and it would focus on off-site displays, traveling exhibits, and audiovisual media. No on-site interpretation would be provided by Park Service personnel. The Park Service would provide guidance and financial assistance in the development of interpretive media

and the presentation of programs. The Park Service would also work with personnel at other space museums and facilities to ensure consistency of themes, subthemes, media, and materials nationwide.

Preservation

A portion of the budget for the new park unit would go toward the preservation of sites considered to have the highest preservation potential. The Park Service would establish two preservation priority lists--one for launch complexes 5/6 and 26, the original mission control center, and the Apollo launch tower, and another for the affiliated areas--and would distribute funds on an annual basis for high-priority projects. The resources at launch complexes 5/6 and 26 and the original mission control center would be stabilized, restored, or reconstructed, and the Apollo launch tower would be reerected to assure long-term preservation. The Park Service would enter into cooperative agreements with NASA, the Air Force, the Army, the Smithsonian, and other interested organizations for the continued preservation of high-priority sites at affiliated areas. In addition, it would assist NASA, the Air Force, and the Army in the documentation and recordation of active and inactive sites before any modification was undertaken that would affect their historical significance.

OPTION B

Management

The Man in Space sites would remain under the administration of their respective agencies, but they would be designated as affiliated areas of the national park system. The legislation authorizing the affiliated areas would also define the Park Service's role and responsibility in preservation, interpretation, and use of the Man in Space sites. The Park Service would work with the other agencies, advise them regarding preservation and interpretation concerns, and oversee operations related to the sites. Taking into account each agency's mission, the Park Service would prioritize the sites, recommend specific measures for their preservation and interpretation, and prepare a comprehensive interpretive plan for presenting the Man in Space theme to the public. In addition, the Park Service would work with federal, state, local, and private agencies, groups, and individuals to encourage interpretation of the Man in Space theme nationwide.

Funding

Additional funding and authority to hire personnel would be provided to the Park Service through congressional action. The Park Service would in turn allocate funds to the administering agencies for interpreting and preserving the sites. Funding for interpretive and preservation efforts would also be raised through private fund-raising, corporate donations,

sales from visitor services, and visitor fees. The Park Service would support the fund-raising activities of the Apollo Society for the Apollo launch tower.

Interpretation/Visitor Use

An interpretive plan would be developed by the Park Service in cooperation with all of the agencies. The plan would assess the need for on-site interpretation at the affiliated areas and would recommend appropriate media for both on-site and off-site interpretation. An overview of the Man in Space theme would be presented at each of the sites as well as site-specific information describing its individual contributions to the early American space program. The Park Service would provide guidance and technical assistance, including determining the interpretive subthemes/components and the types of historical and photographic sources, exhibitry, displays, and other media to be used, developing a logo and coordinated sign system, and possibly developing a traveling exhibit. It would provide assistance to the Apollo Society or other managing entity in developing consistent interpretive programs once the Apollo launch tower and its associated visitor facilities were constructed. It would also coordinate and work with personnel at other space museums and facilities to assure consistency of themes, subthemes, media, and materials nationwide. Visitor use would continue to be regulated by the managing agencies.

Preservation

Allocation of funds would be based on each site's preservation potential. Documentation and recordation according to section 106 and 110(f) implementing procedures would be required for each property. Agencies would not be prevented from salvaging all or portions of existing facilities unless site preservation was considered essential to interpretation of the Man in Space theme; however, proper documentation would be required before any property was altered. The Park Service as well as the appropriate state historic preservation officer and Advisory Council would be notified of the nature of all alterations. The agencies would receive guidelines and technical assistance from the Park Service and the Smithsonian in preservation activities.

The Park Service would assure preservation of the launch complex 26 service structure (if determined feasible by the engineering study) and would work closely with the Apollo Society and their effort to reerect and preserve the Apollo launch tower.

IMPACTS OF OPTION A

Management and Funding

The Air Force and NASA would transfer management responsibilities to the Park Service at launch complexes 5/6 and 26, the original mission control center, and the Apollo launch tower. Management of the remaining launch complexes at Cape Canaveral and the Kennedy Space Center and the 24 affiliated areas would not be affected. Financial and manpower assistance would be provided by the Park Service and focused on launch complexes 5/6 and 26, the original mission control center, and the Apollo launch tower. Funds would also be allocated to the affiliated areas, so there would be little diversion of other agency funds and staff. Costs to the visiting public could increase.

Interpretation/Visitor Use

This alternative would greatly enhance interpretation at the national historical park and would also provide a nationwide focus for the remaining Man in Space sites as they relate to the early American space program. Visitor access and on-site interpretation would increase at the historical park and might also increase at many of the affiliated areas.

Preservation

This alternative would assure preservation of launch complexes 5/6 and 26, the original mission control center, and the Apollo launch tower. It would also provide for comprehensive section 106 and 110(f) compliance and selected preservation of inactive sites at affiliated areas based on their preservation potential.

IMPACTS OF OPTION B

Management and Funding

Guidance and direction from the Park Service would help the agencies to coordinate in preserving and interpreting their Man in Space resources at all 26 sites. The new funding base and authorization to hire additional personnel would minimize the financial and manpower impacts on the Park Service and other agencies and avoid the need to compete for existing funds and personnel.

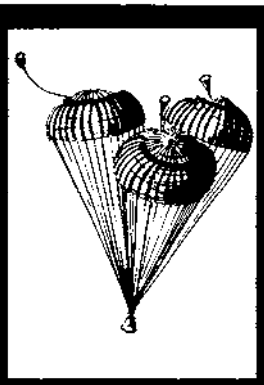
Interpretation/Visitor Use

This alternative would result in coordinated interpretation and increased visitor understanding of the Man in Space theme. The 26 sites would be treated equally in interpretation. Current interpretation, which centers on present and future space programs, would be enhanced because of the

addition of a historical context. On-site interpretation and visitor access would increase.

Preservation

This alternative would provide for preservation of sites with high preservation potential. Other impacts would be the same as those for alternative 3.



APPENDIXES • BIBLIOGRAPHY • STUDY TEAM, AGENCY REPRESENTATIVES, AND CONSULTANTS

APPENDIXES

A: PL 96-344

B: MARCH 18, 1983, AND AUGUST 15, 1986, LETTERS FROM COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

C: OCTOBER 3, 1986, LETTER FROM SECRETARY OF THE INTERIOR

D: NATIONAL PARK SYSTEM THEME REPRESENTATION

E: MAN IN SPACE RESOURCE ANALYSIS TABLE

Public Law 96-344
96th Congress

An Act

To improve the administration of the Historic Sites, Buildings and Antiquities Act of 1935 (49 Stat. 666).

Sept. 8, 1980
(S. 2680)

Man in Space commemoration. Study.

SEC. 18. The Secretary shall conduct, in consultation with the National Aeronautics and Space Administration, the Department of Defense, and any other entities considered by the Secretary to be appropriate, a study of locations and events associated with the historical theme of Man in Space. The purpose of such study shall be to identify the possible locations, components, and features of a new unit of the national park system commemorative to this theme, with special emphasis to be placed on the internationally historic event of the first human contact with the surface of the moon. The study shall investigate practical methodologies to permanently safeguard from change the locations, structures, and at least symbolic instrumentation features associated with this theme, and to display and interpret these for visitor appreciation. Governmental entities controlling these locations, structures, and features are hereby requested to preserve them from destruction or change during the study and congressional review period insofar as is possible. A comprehensive report derived from this study, including potential action alternatives, shall be submitted to the Committee on Interior and Insular Affairs of the United States House of Representatives and to the Committee on Energy and Natural Resources of the United States Senate no later than one complete fiscal year after the effective date of this section.

Report to congressional committees.

"Secretary."

SEC. 19. As used in this Act, except as otherwise specifically provided, the term "Secretary" means the Secretary of the Interior.

Effective date.

SEC. 20. Authorizations of moneys to be appropriated under this Act shall be effective on October 1, 1980. Notwithstanding any other provision of this Act, authority to enter into contracts, to incur obligations, or to make payments under this Act shall be effective only to the extent, and in such amounts, as are provided in advance in appropriation Acts.

Approved September 8, 1980.

B: MARCH 18, 1983, AND AUGUST 15, 1986, LETTERS FROM COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515

March 18, 1983

HAND DELIVERED:
March 22, 1983

Honorable James G. Watt
Secretary of the Interior
Department of the Interior
Washington, D. C. 20240

Dear Mr. Secretary:

As you know, Section 18 of Public Law 96-344 (1980), mandates the Department of the Interior to conduct a comprehensive study of "locations and events associated with the historical theme of Man in Space...with special emphasis to be placed on the internationally historic event of the first human contact with the surface of the moon." A "comprehensive report...including potential action alternatives" was to be submitted to Congress by September 30, 1984, study also was to "investigate practical methodologies to permanently safeguard from change the locations (and) structures...associated with this theme, and to display and interpret these for visitor appreciation."

We have received only a preliminary report, entitled "Reconnaissance Survey: Man in Space", dated November 1981, which was not transmitted to the Committee until March 1982. Although this brief report does a good job of highlighting the significance of many of the engineering structures and features associated with our nation's early space program, and touches upon the problems of deterioration and lack of visitor access, it does not contain any discussion of practical preservation methodologies or specific action alternatives, as required by P.L. 96-344. The section of the preliminary report entitled "Options for Further Action" recommends several additional studies to meet this need. The National Park System Advisory Board, at its March, 1982 meeting, concurred in these recommendations.

At this time, NASA has signed a contract to demolish and sell for scrap the last remaining Launch Umbilical Tower (LUT) at Kennedy Space Center Launch Complex 39. This is the tower that launched Apollo 11, resulting in the "internationally historic event of the first human contact with the surface of the moon." The entire comple including the original three LUT's, received the Outstanding Civil Engineering Achievement award from the American Society of Civil

Engineers in 1966; and it was listed in the National Register of Historic Places in May, 1973. Parts of the other two LUT's were adapted to and re-used in a new configuration to support the shuttle program, in accordance with a 1974 Memorandum of Agreement resulting from compliance with Section 106 of the National Historic Preservation Act.

Both the Advisory Council on Historic Preservation and the Florida State Historic Preservation Officer have written NASA stating that NASA's actions in the case of the Apollo 11 LUT violate the understandings reached in 1974, as well as the intent of P.L. 96-344. NASA chose to ignore requests from several Members of Congress and from the Advisory Council on Historic Preservation to delay award of the demolition contract until appropriate preservation alternatives could be explored. Instead, NASA elected to require the demolition contractor to prepare a "preservation option", which apparently NASA expects the preservation community and not the agency itself to exercise--despite the requirements in P.L. 96-344, and the Historic Preservation Act Amendments of 1980 (P.L. 96-515) that place affirmative preservation requirements on appropriate Federal agencies.

Ironically, the Comprehensive Man in Space study was supposed to present such preservation alternatives, precisely for the benefit of the agencies, including NASA, who own and manage the structures and sites associated with the space program. It was also to serve as a guide to Congress in making decisions concerning the future disposition of these historically important sites and structures.

At our Budget Oversight hearing on February 24, 1983, Director Dickenson of the National Park Service mistakenly stated that the National Park Service Advisory Board would be completing a study of these issues by May, 1983; Mr. Dickenson no doubt meant only to refer to the Board's review of the completed National Historic Landmark nomination for the Cape Canaveral Air Force Station, an entirely different matter. He did, however, assure the Committee that the National Park Service would "be coming back to the Congress as soon as we possibly can" with the rest of the Man in Space study.

In view of the current controversy surrounding the demolition of the last remaining Apollo LUT, and the urgent need to develop viable options to preserve this and other major investments in space program facilities, we would like answers to the following questions:

1. What is the schedule for completion of the comprehensive study report required by P.L. 96-344? In particular, what is the schedule for completion of the National Historic Landmark theme study of the facilities related to the Man in Space effort, as called for in the "Options for Further Action" portion of the reconnaissance study? What is the schedule for completion of the study of alternatives for preserving and interpreting resources determined to be significant on the reconnaissance and theme studies?

2. What mechanisms exist for ensuring consultation with NASA, the Department of Defense, and other appropriate "entities" during completion of the report?

3. What level of funding was requested by the Department in FY 1983 and FY 1984 to complete the study and publish the report? How much additional funding (if any) is required to accomplish these tasks?

4. What arrangements have been made with NASA to ensure the HABS/HAER recording of the Apollo 11 LUT at Launch Complex 39 prior to its demolition?

5. What opportunities for private sector involvement in preservation and interpretation of space program facilities have been identified since publication of the reconnaissance survey report? With what private entities have plans been developed to ensure their continued participation in these efforts?

We want to emphasize that the issues addressed in P.L. 96-344 represent on-going problems, of which the Apollo LUT is but one example. The purpose of the study is to provide the Congress with sufficient information for our review (as called for in P.L. 96-344) in order to develop policies and, where necessary, appropriate legislation to deal with these problems. Because of the short deadline we face with NASA's proposal to demolish the Apollo LUT, we would appreciate receiving a response to this letter by March 30th.

We appreciate your assistance on this matter.

Sincerely,

MORRIS K. UDALL, Chairman

JOHN F. SEIBERLING, Chairman
Subcommittee on Public Lands
and National Parks

MANUEL LUJAN, JR., Ranking
Republican

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515

August 15, 1986

Honorable Donald P. Hodel
Secretary of the Interior
U.S. Department of the Interior
Washington, DC 20240

Dear Mr. Secretary:

The accomplishments of the United States manned space program during the 1961-1975 era stand apart as a singularity of greatness in the history of our country. Unfortunately, very little has been done to preserve and protect the locations and structures that played the key roles during this period. Consequently, many facilities of great historical significance have been lost forever because of lack of foresight and neglect.

Section 18 of Public Law 96-344 (1980) mandates the Department of the Interior to conduct a comprehensive study of "locations and events associated with the historical theme of Man in Space....with special emphasis to be placed on the internationally historic event of the first human contact with the surface of the moon." A comprehensive report was to be submitted to Congress by September 30, 1981.

A preliminary report was delivered to the Committee on Interior and Insular Affairs in March 1982. This report was the reconnaissance survey of potential candidate sites and structures. However, P.L. 96-344 required the study to "investigate practical methodologies to permanently safeguard from change the locations (and) structures....associated with this theme, and to display and interpret these for visitor appreciation." To date, we have not received this "potential action alternatives" study report.

In 1983, the Apollo Launch Tower which sent men to the moon for the first time was scheduled for scrapping. After considerable effort by Congress and private groups, NASA had the tower disassembled in an orderly fashion and put in storage for

future assembly. Efforts are on-going to raise private funds for reassembly, but without National Park Service involvement similar to the Statue of Liberty fund raising campaign, the effort will be difficult.

The launch tower on Launch Complex 26 at the Cape Canaveral Air Force Station is currently scheduled for dismantling and possible scrapping. Launch Complex 26 sent the first American satellite into space in 1958, and later became a part of the Air Force Space Museum at the Cape. Lack of funds for proper maintenance are the reasons given for the launch tower's demise. If it is scrapped, it will join a growing list of other historic space structures that no longer exist.

The Apollo Launch Tower is listed in the National Register of Historic Places, and Launch Complex 26 is a National Historic Landmark. They are but two examples of our space history that is being lost. Action must be taken to avoid further decay of an already diminished heritage.

We realize hard choices are having to be made during this period of austere federal funding. However, these structures are irreplaceable, one-of-a-kind examples of engineering and architectural design that hearken back to a unique, epochal period of great accomplishment. Therefore, we ask for your assistance in directing the National Park Service to take the following actions:

(1) Conduct the "potential action alternatives" study for the Man in Space Program and provide recommendations to the Committee on Interior and Insular Affairs on candidate structures for permanent preservation, display, and interpretation. These recommendations should include prioritization of these candidate structures, taking into account historic significance, ease of public access, and immediate and long term maintenance costs. The report should be presented to the Committee by February 1, 1987.

(2) Study possibilities and alternatives to support the private fund raising campaign for reassembly of the Apollo Launch Tower.

(3) Work with the Air Force to establish alternatives to scrapping the Complex 26 launch tower.

It would be appreciated if we could receive an interim report on your progress in these three areas by November 1, 1986.

Thank you for your help and assistance in this matter.

Sincerely,

MORRIS K. UDALL
Chairman

JOHN F. SEIBERLING
Chairman
Subcommittee on Public Lands

ROBERT J. LAGOMARSINO
Ranking Republican Member
Subcommittee on National Parks

MANUEL LUJAN, JR.
Ranking Republican Member
Committee on Science and Technology

C: OCTOBER 3, 1986, LETTER FROM SECRETARY OF THE INTERIOR

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

L58(190)

OCT 3 1986

Honorable Morris K. Udall
Chairman, Committee on Interior
and Insular Affairs
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for your letter of August 15, 1986, requesting the completion of the National Park Service study of the Man in Space Program as outlined in Public Law 96-344.

The National Park Service has completed its inventory of sites associated with the American Space Program as requested by Congress in section 18 of the Act of 1980. I regret the delay in completing the study of protection alternatives, but I am pleased to report that this study will be undertaken during Fiscal Year 1987. In response to the specific concerns outlined in your letter, the study of alternatives will:

1. Provide recommendations to the Committee on candidate structures for permanent preservation, display, and interpretation. These recommendations will include a priority ranking of candidate structures, based on historic significance, ease of public access, amount of visitation, and immediate as well as long-term costs.

2. Study possibilities and alternatives to support the private fundraising campaign for the reassembly and preservation of the Apollo Launch Tower.

3. Work with the Air Force to explore and evaluate alternatives to scrapping the Launch Complex 26 Tower at Cape Canaveral.

As part of this effort, the Service will initiate meetings with appropriate officials in NASA, the Department of Defense, and other public and private organizations to seek their advice on all aspects of the study. During these meetings, the Service will identify private sector resources that may be enlisted to assist in accomplishing the goals of this effort.

I share your concern about the need for prompt action to protect the sites and structures that played key roles in one of our Nation's most outstanding accomplishments. As noted in the reconnaissance study, there are more than 30 sites that contain multiple resources in 11 different States. The scope of this project presents a unique challenge in finding appropriate methods

to preserve and interpret these resources. I have asked the National Park Service to proceed with the study as quickly as possible, and we expect to have the work completed by May 1, 1987. Considering the importance of this project, we do not believe that an adequate job can be done and still meet your target date of February 1, 1987. However, we will be pleased to provide a detailed schedule and progress report by November 1.

Similar letters are being sent to Representatives Seiberling, Lujan, and Lagomarsino.

Sincerely,

Donald Paul Hodel

DONALD PAUL HODEL

bcc: 6221-MIB-Secy's File Copy 6221-MIB-Secy's RF (2) 6221-MIB-ES-8) w/tp & inc.
6246-MIB-CL) w/inc. 3147-MIB-FW 6352-MIB-SOL 5119-MIB-PBA
4221-L ST-2000-DSC) w/inc. 4221-L ST-5000-SER (2)) w/inc. 4221-L ST-001-RF
3013-MIB-763) 3211-MIB-180) 3222-MIB-190-RF 4209-L ST-418)
3106-MIB-001-Mott 3222-MIB-190-Gilley)
FNP:WBrown:343-4285:CL-86-1314/ES-24877:dl-56:9/10/86:
Revised:PBA/CL:dl-56:9/30/86:

D: NATIONAL PARK SYSTEM THEME REPRESENTATION

The Man in Space sites were evaluated for their representation of the cultural themes identified in History and Prehistory in the National Park System and the National Historic Landmarks Program (Washington, D.C.: USDI, NPS 1982). That plan was formulated to provide criteria for evaluating an area's potential for inclusion in the national park system. The first part of the document outlines the aspects of our nation's heritage that merit national park system representation and indicates those not currently represented. Aspects are identified by theme, subtheme, facet, and subfacet. Based on the study team analysis, the 25 national historic landmarks and one nationally significant National Register site represent one theme, three subthemes, five facets, and two subfacets:

Theme 7: America at Work
- Subtheme c: Science and Invention
  - Facet 4: Communications
  - Facet 7: Scientific Exploration
  - Facet 8: Transportation
- Subtheme d: Transportation and Communications
  - Facet 1: Transportation
    - Subfacet c: Air
    - Subfacet d: Space
- Subtheme f: Engineering
  - Facet 2: Transportation Systems

The areas representing the theme "America at Work" have been increasing in recent years. Currently, the following park units represent the theme and its subthemes, facets, and subfacets:

Theme 7: America at Work		
Subtheme c:	Science and Invention	
Facet 4:	Communications	Edison NHS
Facet 7:	Scientific Exploration	Grand Canyon NP
Facet 8:	Transportation	Wright Brothers N Mem.
Subtheme d:	Transportation and Communication	
Facet 1:	Transportation	
Subfacet c:	Air	Gateway NRA (airfields)
Subfacet d:	Space	None
Subtheme f:	Engineering	
Facet 2:	Transportation Systems	Allegheny Portage Railroad NHS Chesapeake and Ohio Canal NHP George Washington Memorial Parkway Glacier NP Shenandoah NP Zion NP

As noted, subfacet d. Space is currently not represented in the national park system. The Man in Space sites can provide a significant contribution to our cultural heritage.

E: MAN IN SPACE RESOURCE ANALYSIS

Resource	Ownership	Category	Present Use	Accessibility	1986 Visitation	Interpretive Potential	Condition/ Integrity	Threats to Resource	Significance
Langley Research Center Hampton, Virginia	NASA	Facility		Visitor center inside facility	202,157				
1. Variable density tunnel	NASA	Structure/ NHL	Inactive	Restricted		M	Excellent/altered	M	1921-78--The VDT for the first time allowed models to exactly duplicate real flight conditions with respect to predicting flow characteristics; it was the world's first pressurized wind tunnel.
2. Full scale tunnel	NASA	Structure/ NHL	Active/ scientific aeronautical research	Restricted		M	Excellent/altered	M	1931-present--Some questions could not be answered using models in the VDT; the FST allowed the testing of full-scale aircraft; it tested all WWII airplanes.
3. Eight-foot high speed tunnel	NASA	Structure/ NHL	Inactive	Restricted		L	Poor/altered	H	1936-56--This was the first continuous-flow high-speed wind tunnel to accommodate sizable models and actual airplane parts; the addition of the slotted throat was revolutionary for its time and gave accurate wind tunnel data in the transonic range.
4. Lunar landing research facility	NASA	Structure/ NHL	Active/ aeronautical	Restricted		H	Excellent/altered	M	1965-1972--This facility was an indispensable tool in landing a man on the moon; the LEM was used by Apollo astronauts as a training simulator to study and practice piloting problems in the final phase of a lunar landing mission; this facility was also used as a lunar-walking simulator.
Apollo lunar excursion module	NASA	Object/NHL	Inactive	Restricted		H	Poor/altered	H	
5. Rendezvous docking simulator	NASA	Object/NHL	Inactive	Restricted		H	Fair/altered	H	1963-1972--This facility was also indispensable to moon landing; it was used to study pilot-controlled docking of various spacecraft and permitted Gemini and Apollo astronauts to train in docking procedures to master a moon landing; it provided docking in a 3D mode.
Marshall Space Flight Center Huntsville, Alabama	NASA	Facility		Visitor center at Alabama Space and Rocket Center	131,534				
6. Redstone test stand	NASA	Structure/ NHL	Inactive	Bus tour		H	Excellent/unaltered	L	1953-1961--This was the first test stand in the U.S. to accommodate an entire launch vehicle for static tests; it was also an important facility in the development and evolution of the Redstone, including Jupiter C and the Mercury/Redstone that launched the first U.S. satellite and the first U.S. manned spaceflight; it was used to develop man-rated launch procedures vital to manned spaceflight.
7. Propulsion and structural test facility	NASA	Structure/ NHL	Active/ space program	Bus tour		H	Excellent/altered	M	1957-present--Built initially to test Redstone rockets, this facility was later responsible for testing large launch vehicles and rocket propulsion systems, including the Saturn family of rockets that resulted in the moon landing; through its continual use and modification to meet changing needs, it reflects the development of large launch vehicles and propulsion systems needed to support the U.S. space program.
8. Saturn V dynamic test stand	NASA	Structure/ NHL	Inactive/ hold	Bus tour		H	Excellent/altered	M	1964-present--Built to conduct mechanical and vibration tests on fully assembled Saturn V rockets, this stand represents the last step in the testing process before a Saturn V was accepted for full flight status; here the entire vehicle was tested under dynamic load conditions before going to launch complex 39 at the Kennedy Space Center.

NHL - National Historic Landmark
NR - National Register Site (national significance)
L,M,H - Low, Moderate, High

Resource	Ownership	Category	Present Use	Accessibility	1986 Visitation	Interpretive Potential	Condition/ Integrity	Threats to Resource	Significance
9. Neutral buoyancy space simulator	NASA	Structure/ NHL	Active/ space program	Bus tour		H	Excellent/unaltered	L	1955-present--This facility provides a simulated zero-gravity environment in which engineers, designers, and astronauts can perform for extended periods; it contributed to the Gemini, Apollo, Skylab, and space shuttle programs; it was unique until 1970 when the Johnson Space Center built one for the space shuttle program.
Alabama Space and Rocket Center Huntsville, Alabama	State of Alabama	Museum/ display	Active/ interpretation	Visitor center	403,844				
10. Saturn V space vehicle	Smithsonian Institution	Object/ NHL	Display artifact	Unrestricted		H	Very good//unaltered	L	1965-1973--This was the vehicle type that carried Armstrong, Aldrin, and Collins to the moon; the Saturn V vehicle was conceived for a specific purpose--lunar landing. Developed by the Marshall Space Flight Center and used during a 7-year period, Saturn Vs were used in 13 launches, including two unmanned test flights, 10 Apollo flights, and one Skylab mission; the Saturn V performed perfectly on all missions.
Vandenberg Air Force Base Lompoc, California		Facility		No visitor center	100,000 open house 12,203 tours				
11. Space launch complex 10	Air Force	Structure and site/NHL	Inactive	Restricted		H	Excellent/altered	L	1957-1980--This is a rare surviving example of a launch complex built in the 1950s at the beginning of the U.S. effort to explore space.
White Sands Missile Range New Mexico	Army	Facility		Visitor center inside facility	3,500				
12. Launch complex 33	Army	Structure and site/ NHL	Inactive/ visitor use	Restricted		H	Excellent/unaltered	L	1943-1951--Launch complex 33 was developed specifically to accommodate V-2 rocket tests at White Sands; the V-2 gantry crane and blockhouse represent the first generation of large-scale rocket testing facilities that led to the American exploration of space and the first manned landing on the moon; the V-2 provided the technological base upon which the United States would build the Saturn family of rockets that eventually carried Americans to the moon; launch complex 33 also provided the facilities at which scores of Americans learned the techniques of launching large rockets.
Jet Propulsion Laboratory Pasadena, California	NASA	Facility		Limited visitor center inside facility	20,000				
13. Twenty-five-foot space simulator	NASA	Structure/ NHL	Active/ space program	Restricted		M	Excellent/altered	M	1961-present--This simulator is capable of producing true interplanetary conditions of extreme cold, high vacuum, and intense solar radiation and can accommodate most modern spacecraft; the collimating mirror was the first to produce the intense solar radiation of space. The Ranger, Surveyor, Mariner, and Voyager spacecrafts were tested here.
14. Space flight operations facility	NASA	Building/ NHL	Active/ space program	Restricted		H	Excellent/altered	M	1963-present--JPL is NASA's primary center for unmanned exploration of the planets; it is significant because it is the hub of the vast communications network through which NASA controls its unmanned spacecraft flying in deep space.
Goldstone Deep Space Communications Complex Fort Irwin, California	NASA	Facility		No visitor center	2,000				
15. Pioneer deep space station	NASA	Structure/ NHL	Inactive	Restricted		H	Excellent/unaltered	L	1958-1978--This station represents the first generation of 26-meter antennas that enabled NASA to solve the technical problems of tracking deep space probes and it was the prototype for the entire deep space network system; it was developed when NASA assigned JPL to explore the moon and planets.

Resource	Ownership	Category	Present Use	Accessibility	1986 Visitation	Interpretive Potential	Condition/ Integrity	Threats to Resource	Significance
Johnson Space Center Houston, Texas	NASA	Facility		Visitor center inside facility	1,120,093				
16. Apollo mission control center	NASA	Building/ NHL	Active/ space program	Restricted		H	Excellent/altered	M	1965-present--This facility is significant because of its close association with the U.S. manned space program; it monitored several Gemini and all Apollo flights, including Apollo 11. Apollo mission control and complex 39 supported the moon landing event and provided technical management of all systems in Apollo.
17. Space environment simulation laboratory	NASA	Structure/ NHL	Active/ space program	Restricted		H	Excellent/unaltered	M	1965-present--This laboratory was designed to conduct thermal-vacuum testing for all U.S. manned spacecraft of Apollo era; full-scale hardware could be tested for factors including temperature fluid leak rates, absorptive measures, and coatings; it was essential to man-rate flight hardware.
Ames Research Center Moffett Field, California	NASA	Facility		Limited visitor center inside facility	20,000				
18. Unitary plan wind tunnel	NASA	Structure/ NHL	Active/ space program	Restricted		M	Excellent/altered	M	1955-present--This is an excellent product of the Unitary Plan Act to aid the American aircraft industry--one transonic and two supersonic tunnels--and is significant because it represents the continual development of superior aeronautical research facilities after the end of WWII. It later became a NASA facility and was important to the moon launch.
Lewis Research Center Cleveland, Ohio	NASA	Facility		Visitor center inside facility	87,727				
19. Rocket engine test facility	NASA	Structure/ NHL	Active/ space program	Restricted		H	Excellent/altered	M	1957-present--This test facility is nationally significant because of its contribution in the development of the lightweight, regeneratively cooled hydrogen engine for vertically mounted rocket engines; it developed the use of hydrogen for the engines used in the Centaur, Saturn, and space shuttle rockets.
20. Zero-gravity research facility	NASA	Structure/ NHL	Active/ space program	Restricted		H	Excellent/altered	M	1966-present--The zero-gravity facility is the only one of its type in the free world and is directly linked to the development of the Centaur and Saturn upper stage rockets; the data provided by this facility on the physics of liquids in a zero-gravity environment was indispensable to the success of high-energy liquid-fueled rockets.
Plum Brook Operations Division Sandusky, Ohio	NASA	Facility		No visitor center	0				
21. Spacecraft propulsion research facility	NASA	Structure/ NHL	Inactive/ on hold	Restricted		M	Fair/altered	M	1968-present--This facility was significant in the development of the Centaur rocket; it allowed rockets to be fired under space conditions; the Centaur launched the Pioneer, Viking, and Voyageur.
Dryden Flight Research Center	NASA	Facility		Visitor center inside facility	43,000				
Edwards AFB, California	USAF	Facility		No visitor center	500,000 open house 7,600 tours				
22. Rogers Dry Lake	USAF	Site/NHL	Active/ aeronautical/ space program	Restricted		H	Excellent/unaltered	L	1933-present--The 60 miles of runway and broad expanse of hardened clay form the largest natural landing field in the world; Edwards AFB is the world's premier flight testing and research center; from the 1947 Bell X-1 through today's shuttle, the dry lake has made possible the successful development and testing of generations of spacecraft.

Resource	Ownership	Category	Present Use	Accessibility	1986 Visitation	Interpretive Potential	Condition/ Integrity	Threats to Resource	Significance
Goddard Space Flight Center Greenbelt, Maryland	NASA	Facility		Visitor center outside facility	73,237				
23. Spacecraft magnetic test facility	NASA	Structure/ NHL	Active/ space program	Restricted		L	Excellent/altered	M	1966-present--This facility made it possible to determine and minimize the magnetic movement of even the largest unmanned spacecrafts and thereby reduce unwanted torque; it is unique in the U.S.
National Space Technology Laboratories Bay St. Louis, Mississippi	NASA	Facility		Visitor center inside facility	90,000				
24. Rocket propulsion test complex A1/A2, B1/B2	NASA	Structure/ NHL	Active/ space program	Restricted		M	Excellent/altered	M	1965-present--This complex was used for flight-certifying larger rocket propulsion systems; it was the primary site for conducting research, development, and certification testing on nonflight engines to improve and upgrade basic engine design; this complex provided the critical final step in certifying the first stage of the Saturn V rocket for flight.
Kennedy Space Center, Florida	NASA	Facility		Visitor center outside facility	2,200,000				
25. Launch complex 39	NASA	Site/NR	Active/space program	Restricted		H	Varied	M	1962-present--Launch complex 39 is the site of man's first voyage from earth to another celestial body, which began at 9:32 a.m., July 16, 1969; the first launch from complex 39 was the unmanned earth-orbital Apollo 4 mission, launched November 9, 1967; other historic spaceflights in the Apollo program originating from launch complex 39 were two manned circumnavigations of the moon (Apollo 8, launched December 21, 1968, and Apollo 10, launched May 18, 1969), one manned earth-orbital flight (Apollo 9, launched March 3, 1969), and six successful manned lunar landing missions (Apollo 11, Apollo 12, launched November 14, 1969; Apollo 14, January 31, 1971; Apollo 15, July 26, 1971; Apollo 16, 1972; and Apollo 17, December 7, 1972); one manned lunar landing mission, Apollo 13, was successfully launched April 11, 1970, but forced to abort due to spacecraft problems. The crew returned safety to earth.
Vehicle assembly building		Building/NR	Active/space program	Restricted		H	Excellent/altered	M	
Launch control center		Building/NR	Active/space program	Restricted		H	Excellent/altered	M	
Three mobile launchers		Structure/NR	Active/space program	Restricted		H	Excellent/altered	M	
Mobile service structures		Structure/NR	Active/space program	Restricted		H	Excellent/altered	M	
Two crawler-transporters		Object/NR	Active/space program	Restricted		H	Excellent/unaltered	M	
Crawlerway		Roadbed/NR	Active/space program	Restricted		H	Excellent/unaltered	L	
Launch pads A and B		Structure/NR	Active/space program	Restricted		H	Excellent/altered	M	
Apollo launch Tower		Structure/NR	Inactive	None		H	Good/disassembled	H	

Resource	Ownership	Category	Present Use	Accessibility	1986 Visitation	Interpretive Potential	Condition/ Integrity	Threats to Resource	Significance
Smithsonian Institution National Air and Space Museum Washington, D.C.	Smithsonian Institution	Museum	Visitor use	Museum	7,400,000	H	Not applicable	Not Applicable	
26. Cape Canaveral Air Force Station, Florida	Air Force	Facility		Visitor center at Kennedy Space Center	84,117				
Launch complex 5/6	NASA	Structure/ NHL	Inactive/ visitor use	Bus tour		H	Good/altered	L	1955-1962--Launch complex 5/6 is a dual pad with shared blockhouse; it was built for the Redstone missile testing program. From pad 5 were launched Alan Shepard's Freedom 7 in 1961 and Gus Grissom's Liberty Bell 7 in 1961; blockhouse is now used as a NASA space museum.
Launch complex 26	Air Force	Structure/ NHL	Inactive/ visitor use	Bus tour		H	Good/altered	L	1957-1963--Launch complex 26 was constructed for the Redstone program and is associated with complex 5/6; Explorer 1 was launched from 26B by a JUNO 1 rocket in 1958; 26A launched primates Ham, Gordo, Able, and Baker; 26B still contains the original service structure, blockhouse, and most of the equipment used in early launches; blockhouse 26 is the only known blockhouse to have had an abortive launch fall on it; the Explorer 1 satellite in front of museum is an original backup satellite; complexes 5/6 and 26 retain their integrity and give visitors a good understanding of facilities associated with the early American space program.
Service structure	Air Force	Structure/ NHL	Inactive/ visitor use	Bus tour		H	Poor/unaltered	H	
Launch complex 13	Air Force	Structure/ NHL	Inactive	Restricted		H	Fair/altered	H	1956-1978--Launch complex 13 was constructed in 1956-58 to support the Atlas research program; the Atlas was developed by the Air Force as the nation's first intercontinental ballistic missile; complex 13 also launched Atlas/Agena vehicles for earth orbit and deep space missions; it contains the only service structure still standing associated with manned space flight other than those at complex 39, and it illustrates the support facilities required for Mercury/Atlas flights.
Launch complex 14	Air Force	Structure/ NHL	Inactive	Restricted		H	Poor/altered	H	1957-1967--Launch complex 14 was also constructed in 1956-58 to support the Atlas research program; all manned orbital Mercury/Atlas missions were launched from here.
Launch complex 19	Air Force	Structure/ NHL	Inactive	Restricted		H	Poor/salvaged	H	1959-1977--Launch complex 19 was the site of Titan ICBM liftoff in 1960 and of 10 Gemini launches; Project Gemini expanded and refined scientific and technological endeavors, adding a second crew member and a maneuverable spacecraft.
Launch complex 34	Air Force	Structure/ NHL	Inactive	Restricted		H	Poor/salvaged	H	1959-1972--Launch complex 34 supported the flight testing program for the Saturn I and Saturn IB launch vehicles; 15 Saturn vehicles were launched from complex 34 and 37; astronauts Grissom, White, and Chaffee died here; the service structure and tower have been salvaged.
Original mission control center	NASA	Building/ NHL	Inactive/ visitor use	Bus tour		H	Good/unaltered	M	1957-1965--The original mission control center was used for all Mercury flights and the first three Gemini flights; it provided flight control from liftoff to splashdown; the Johnson Space Center took over this function in 1965; this facility is interpreted for the public.

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Publication services were provided by the graphics and editorial staffs of the Denver Service Center. NPS D-295, June 1987