HISTORICAL SURVEY AND EVALUATION OF FACILITY 49635/ENVIRONMENTAL HEALTH/ HEALTH PHYSICS FACILITY (BOSU), CAPE CANAVERAL AIR FORCE STATION, BREVARD COUNTY, FLORIDA

Prepared for:

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1.0 INTRODUCTION

1.1 Purpose and Objectives

In February 2012, Archaeological Consultants, Inc. (ACI) conducted a historical survey and evaluation of Facility 49635/Environmental Health/Health Physics Facility, originally called the Bioastronautics Operational Support Unit (BOSU), at the Cape Canaveral Air Force Station (CCAFS) in Brevard County, Florida (see Figure 1). The facility is presently owned by the National Aeronautics and Space Administration (NASA) John F. Kennedy Space Center (KSC). This work was performed on behalf of the KSC Environmental Management Branch under contract to InoMedic Health Applications, LLC (IHA; formerly Innovative Health Applications) (Task Order No. 019, Basic Ordering Agreement No. IHA-BOA-09-009A).

The purpose of the survey, conducted in accordance with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended, was to evaluate the significance of the BOSU in terms of the criteria of eligibility for listing in the National Register of Historic Places (NRHP) (36 CFR Part 60.4). The facility is proposed for turnover back to the United States Air Force (USAF) to reduce the footprint and inventory of facilities not required for future programs by KSC. If the USAF declines the return of this facility, NASA KSC proposes to demolish the facility in Fiscal Year 2012.

1.2 Methods

The historical survey and assessment of the BOSU entailed three tasks: research and context development, field survey, and preparation of draft and final reports. Archival research and historical context development were accomplished between February and May 2012. Research was conducted at the KSC Archives Department, the KSC Institutional Imaging Facility, the KSC Engineering Documents Center, the Air Force Space and Missile History Center, and various NASA center websites. In addition, numerous informal interviews were conducted with NASA and USAF civil servants and contractors who worked in the facility. Based upon the research findings, a historic context for the early United States (U.S.) Manned Space Programs, Project Gemini in particular, was developed, as well as a context for early USAF and Department of Defense (DoD) support of NASA.

The field survey of the facility, conducted on February 15, 2012, included guided tours of all portions of the BOSU, as well as interviews with the Facility Manager and other personnel regarding the history and uses of the BOSU. Descriptive information was recorded on site, including construction materials and distinguishing structural features, and digital photographs were taken of exterior elevations and selected interior views.

Following the collection of data through research and field survey, the BOSU was evaluated for its significance in terms of the eligibility criteria for listing in the NRHP. Guidance in applying the criteria was provided by reference to a number of U.S. Department of the Interior, National Park Service publications, including *Guidelines for Applying the National Register Criteria for Evaluation* (Bulletin 15); *Guidelines for Completing National Register of Historic Places Forms: How to Complete the National Register Registration Form* (Bulletin 16A); and *Guidelines for Evaluating and Nominating Properties that Have Achieved Significance within the Last Fifty Years* (Bulletin 22).

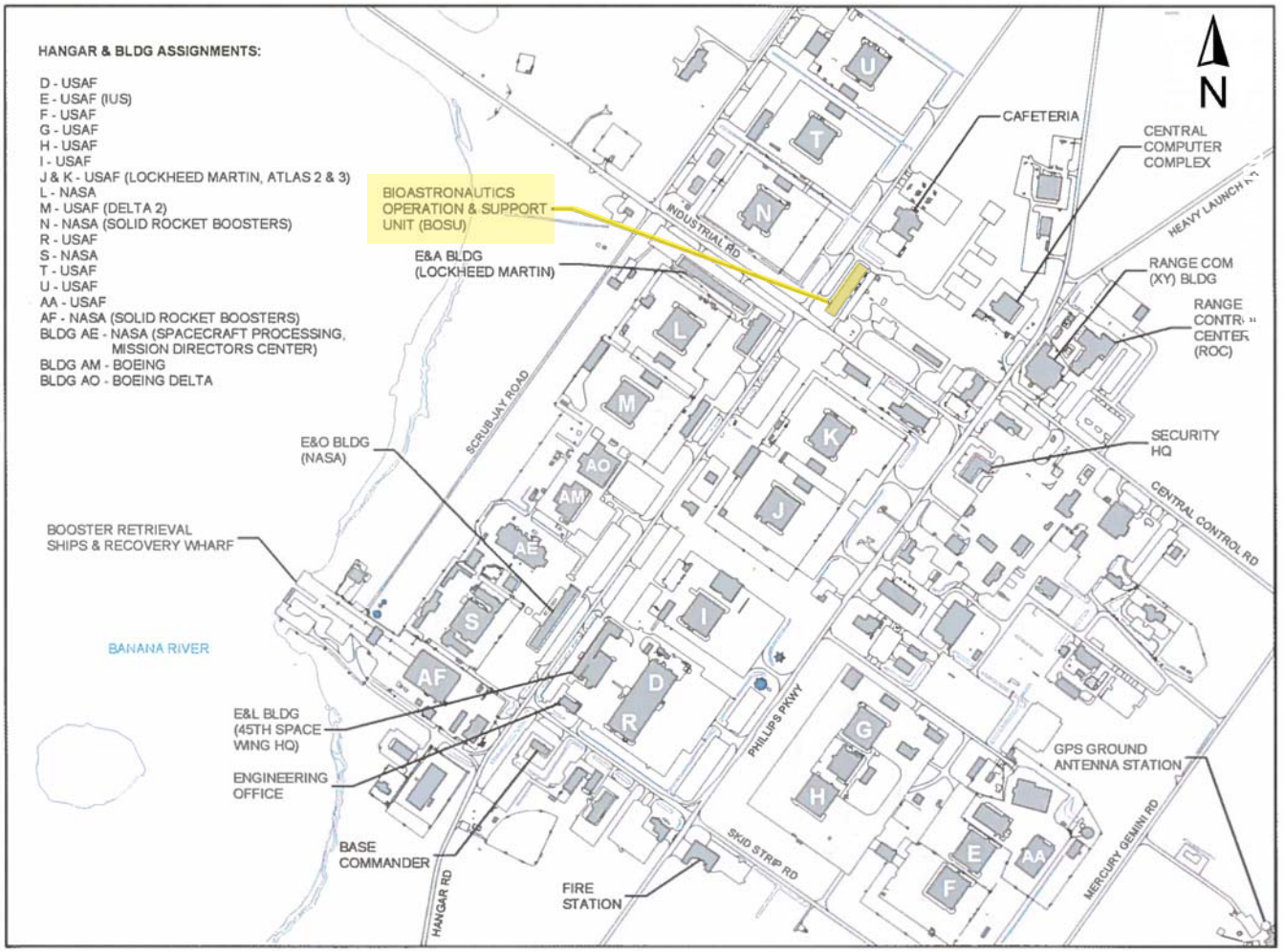

Figure 1. Location of Facility #49635/Environmental Health/Health Physics Facility (BOSU) in the Industrial Area of CCAFS (Source: KSC External Relations and Business Development Directorate, 2004).

1.3 Acknowledgements

The historical survey of the BOSU benefited from the cooperative efforts of many individuals. Special thanks are extended to KSC Historic Preservation Officer, Barbara Naylor, and to KSC Cultural Resource Specialist Nancy English for coordinating access to the facility and personnel as well as providing informational materials. We gratefully acknowledge the generous assistance of Carlton Hall, Doug Husted, and Rodney Nickell, IHA, for providing a tour of the facility, as well as names of potential informants. ACI would also like to thank the many individuals who shared their knowledge of the history and use of the facility, including Bob Martin, Norman Fields, Randy Sumner, and Bob Thomas. Elaine Liston, KSC Archivist, Thomas Penders, CCAFS Cultural Resource Manager, Emily Perry, Air Force Space and Missile History Center Director, and Sonny Witt, CCAFS Director of Operations, are thanked for providing archival source materials and general information about the facility. ACI is also grateful to Jane Provancha, IHA, for contract and logistical support.

2.0 HISTORICAL CONTEXT

2.1 Introduction

On October 4, 1957, the Union of Soviet Socialist Republics (USSR) launched the first man-made Earth satellite, Sputnik 1; on November 3, 1957, the USSR placed Sputnik II, carrying a dog named Laika, into orbit. This sparked a wave of interest in space exploration among the American public. Less than two weeks after the launch of Sputnik II, Senator Lyndon B. Johnson called for, and chaired, an examination of the American space effort (Launius 2001). On February 6, 1958, the U.S. Congress formed the Committee on Space and Astronautics to frame legislation for a national space program (Grimwood 1963). On July 29, 1958, President Dwight D. Eisenhower signed the National Aeronautics and Space Act into law. Subsequently, as per this Act, NASA was officially established on October 1, 1958, to carry out all nonmilitary space projects (Grimwood 1963; Launius 2001). In support of these efforts, NASA used several facilities at the CCAFS in Florida.

2.2 Cape Canaveral Air Force Station

With the increasing concern over Soviet missile and nuclear development after World War II, the DoD created the Committee on Long Range Proving Grounds in October 1948. One of their first duties was to select a suitable missile test site. Four locations were examined, including an area near Washington State, with tracking stations in the Aleutian Islands of Alaska; the Naval Air Missile Test Center at Point Mugu, California; the Naval Air Station at El Centro, California; and Cape Canaveral, Florida, which was near the existing Banana River Naval Air Station (now Patrick Air Force Base [AFB]; for ease of discussion, the name Patrick AFB will be used throughout the context) (Butowsky 1983). Cape Canaveral was eventually selected for several critical reasons. First, the Government already owned land at the Cape, and the undeveloped nature of the remaining land made it less expensive to acquire. In addition, its isolated location enhanced security for research and development. Furthermore, the launch area was accessible via water, easing the logistics of transporting heavy rockets and building supplies. Operationally, missiles could be launched over the Atlantic Ocean and tracked from islands, such as Bermuda. Also, Florida's temperate climate allowed year round operation of a missile site (Benson and Faherty 1978; Butowsky 1983; Barton and Levy 1984; Lethbridge 2000).

In May 1949, President Harry S. Truman signed the legislation to officially establish the Joint Long Range Proving Ground at Cape Canaveral, with Patrick AFB as the support base. Although the entire facility was initially under the cooperative use of the Army, Navy, and USAF, the USAF, by a directive of the DoD, ultimately assumed responsibility for the Range. Subsequently, on May 16, 1950, the Cape Canaveral missile range was redesignated as the Long Range Proving Ground, the first of many subsequent name changes (Lethbridge 2000); its current name of CCAFS will be used throughout for ease of reference.

Construction at the southern tip of Cape Canaveral commenced in July 1950, under the direction of the Jacksonville District of the U.S. Army Corps of Engineers. These activities included the construction of Port Canaveral and Launch Complexes (LC) 1, 2, 3, and 4. Although not fully completed, the Army conducted the first successful launch, a Bumper rocket from LC 3, on July 24, 1950. Construction of LC 3 was completed by 1951. By 1952, LC 4 was finished, followed closely by LC 1 and LC 2 in 1953 (Butowsky 1983; Lethbridge 2000).

During the late 1940s and early 1950s, USAF activities at CCAFS focused on winged cruise missile research and development as a deterrent force in the weapons race between the U.S. and the USSR. The earliest launch pads (LC 1, LC 2, LC 3, LC 4, LC 9, LC 10, LC 21, and LC 22), located at the southern tip of the CCAFS, were used for firing experimental winged missiles including the Lark, Matador, Navaho, Snark, Bomarc, Bull Goose, and Mace. Support buildings, including a communications building, a water plant, a fire fighting unit, electrical substations, a skid strip for the landing and reuse of the missiles, and Hangars C and O, were constructed near these original launch pads (Bramlitt 1971; Barton and Levy 1984; Neufeld 1990).

In 1952, the USSR detonated their first thermonuclear device. Additionally, intelligence reports indicated that they were also developing long-range missiles. Not to be outdone, the U.S. began to advance their ballistic missile development, and by 1955, USAF officials convinced President Eisenhower to assign the intercontinental ballistic missile (ICBM) development program the highest national priority. Subsequently, the DoD approved two intermediate range ballistic missile (IRBM) programs: the USAF's Thor Program and the Army/Navy's Jupiter Program. Both were developed simultaneously and were assigned an equal national priority (Neufeld 1990).

The drive to develop more accurate and powerful weapons led to the construction of numerous additional launch complexes along the CCAFS. Many of the earliest launch complexes were adapted to new uses, such as support structures, for these facilities. Since the government maintained programs for both ICBMs and IRBMs, launch complexes for both types of missiles were constructed at CCAFS. Over time, the southern area of the CCAFS was developed for launching IRBMs (Redstone, Pershing, Polaris/Poseidon, and Thor) and included LCs 5, 6, 17, 18, 25, 26, 29, and 30. The northern area of the CCAFS was developed for launching ICBMs and space launch vehicles (Atlas, Titan, Saturn) and included LCs 11, 12, 13, 14, 15, 16, 19, 20, 34, 36, and 37 (Barton and Levy 1984; Messick, Rhodes, and Cantley 1996; Gibson 2000).

In 1955, President Eisenhower announced that the U.S. would launch an unmanned satellite as part of the nation's participation in the International Geophysical Year, which was planned for July 1957 through December 1958. Initially, the U.S. Navy's Project Vanguard was chosen to complete this task. Although the Vanguard made use of the reliable Viking rocket, the first test flight did not occur until December 8, 1956, with the second test flight launching on May 5, 1957; both lifted off from CCAFS. After the successful Soviet launches of Sputnik I (October 4, 1957) and Sputnik II (November 3, 1957), and the failure of the third Vanguard test flight, President Eisenhower and the DoD approved the Army's Explorer Project, which was under its Development Operations Division led by Dr. Wernher von Braun (Benson and Faherty 1978). The U.S. successfully entered the space race with the launch of the Army's scientific satellite Explorer I from CCAFS on January 31, 1958, using a four stage Jupiter C missile named Juno I (Launius 2001).

Realizing the military's involvement in the space program would jeopardize the goal of using space for peaceful purposes, the President's Science Advisory Committee urged that a centralized agency be created to oversee the scientific exploration of space. Thus, NASA was established as a civilian agency with the mission of carrying out scientific aeronautical and space exploration, both manned and unmanned (Barton and Levy 1984; Hall 1998). Forming the core of this new agency was the National Advisory Committee for Aeronautics (NACA), which had been a leader in flight research since 1915. NACA also had long working relationships with the different U.S. military branches, and the ability to take that research and apply it to civilian applications. Above all, the group had the advantage of a "peaceful, research-oriented image" (Bilstein 2003).

Soon after the creation of NASA, Navy personnel and facilities associated with Project Vanguard, and over 400 scientists from the Naval Research Laboratory, were reassigned to NASA, as was the Army-affiliated Jet Propulsion Laboratory of the California Institute of Technology. Initially working with NASA as part of a cooperative agreement, President Eisenhower officially transferred a large portion of the Army's Development Operations Division, including the team led by von Braun to NASA in March 1960. At the same time, Eisenhower named the Huntsville NASA installation the Marshall Space Flight Center, and designated the Missile Firing Laboratory at CCAFS as the Launch Operations Directorate of NASA.

2.3 Project Mercury

Project Mercury was NASA's first manned spaceflight program, and was active from December 1958 through May 1963. The goals of the project were to "(1) Place a manned spacecraft in orbital flight around the Earth. (2) Investigate man's performance capabilities and his ability to function in the environment of space. (3) Recover the man and the spacecraft safely" (Williams, Kleinknecht, Bland, and Bost 1963:2). Over the course of the program, NASA successfully designed a vehicle that could survive the conditions of space, as well as atmospheric reentry; hired and trained the first U.S. astronauts; developed a worldwide tracking network; created mission control procedures that became the protocol for all future programs; and launched 26 missions (manned and unmanned).

Photo 1. Launch of MR-3 from LC 5, May 5, 1961.
Source: Johnson Space Center, S61-02408, http://images.jsc.nasa.gov/lores/S61-02408.jpg.

All 26 missions launched as part of Project Mercury occurred between August 1959 and May 1963. Each of these flights fell into one of three mission categories: research and development, qualification, or manned. Of the 26 missions, seven were considered research and development, 13 were classified as qualification, and six were manned flights. Seventeen of the missions, including all of the manned flights, launched from CCAFS; the remaining nine lifted-off from Wallops Island, Virginia. During this time, seven missions launched from LC 5, including the

first U.S. suborbital ballistic flight of Alan Shepard (May 5, 1961) with a Redstone rocket, and 10 launched from LC 14, including the first U.S. orbital flight of John Glenn (February 20, 1962) with an Atlas rocket. The CCAFS also provided facilities for the tracking network, such as the original Mercury Control Center and Hangar S for simulators and astronaut quarters. Despite the pace of Project Mercury, the U.S. was unable to beat the Russians, who had successfully launched cosmonaut Yuri Gagarin on April 12, 1961.

2.4 Project Gemini

Project Gemini unofficially got its start in May 1959, when NASA Headquarter's Research Steering Committee for Manned Space Flight, commonly known as the Goett Committee after its leader Harry Goett, met for the first time to examine follow-up programs for Project Mercury (Grimwood and Hacker 1969; Brooks, Grimwood, and Swenson 2009). Initial ideas included a two-man capsule, extended duration flights (up to two weeks), a manned lunar expedition, and a manned orbiting laboratory. Although lunar exploration became the major focus, the Goett Committee noted that there should be an intermediate step between Project Mercury and a lunar mission. Three months later, a New Projects Panel of the Flight Systems Division of the Space Task Group, met to develop that intermediate step, but instead began to focus on a spacecraft suited for a lunar mission (Hacker and Grimwood 1977).

In October 1959, the panel returned to its original task by examining a report by McDonnell Aircraft Corporation, contractor of the Mercury spacecraft, who proposed six space flight experiments using a modified Mercury capsule. Although the panel was not completely satisfied with any of the six options, it decided to combine the first three into a single proposal that would test the modified vehicle's maneuverability and guidance (Grimwood and Hacker 1969). The panel subsequently made a formal request to initiate the project; however, it remained overshadowed by the prospect of a trip to the Moon. Throughout the remainder of 1959 and much of 1960, NASA retained a general interest in the project, but failed to develop a specific proposal with clearly defined costs, which kept the idea in the background. Additionally, in July 1960, NASA officially announced the start of the Apollo Program, which at the time consisted only of a circumnavigation of the Moon (Hacker and Grimwood 1977).

In January 1961, during a meeting of the NASA's Space Exploration Program Council, the focus of Apollo shifted from a lunar reconnaissance to a manned lunar landing. The council formed a committee, headed by George Low (Chief of Manned Space Flight, Office of Space Flight Programs), to determine the best approach for reaching the Moon's surface. The options at the time were Earth orbit or lunar orbit rendezvous and direct ascent. The committee's report, issued in February, noted that rendezvous provided the fastest means to develop the capability for a lunar landing. In the meantime, the leaders of the Space Task Group (STG; this group eventually became the Manned Spacecraft Center, and then Johnson Space Center) saw both rendezvous and extended time in orbit as possible focal points for a follow-on Mercury program. Over the next few months, NASA continued its research into rendezvous and direct ascent, and also began to work with McDonnell on an improved Mercury spacecraft, which came to be known as Mercury Mark II by April (Hacker and Grimwood 1977)

The May 25, 1961, speech by President Kennedy, which charged NASA with landing on the Moon by the end of 1969, placed the discussion of rendezvous versus direct ascent in a critical path (Grimwood and Hacker 1969). Two task groups were created, one of which detailed rendezvous schemes; the other focused on direct ascent. In the meantime, work continued on the

Mark II spacecraft, which resulted in an almost complete redesign of the Mercury vehicle's systems. Additionally, the designers began to consider the use of a new USAF ICBM, the Titan II, as the launch vehicle (Hacker and Grimwood 1977).

On July 7, 1961, representatives of McDonnell attended a senior staff meeting of the STG and presented three alternatives for an advanced capsule. The first was a minimal approach that consisted mostly of cutting hatches in the outer shell of the capsule for improved access. The second was a reconfigured spacecraft, which greatly resembled that presented at the June 9th meeting; the third was a two-man version of the Mercury spacecraft. Later that month, officials from the STG and NASA Headquarters as well as several astronauts travelled to McDonnell's St. Louis plant to view mock-ups of the different configurations. As a result, Dr. Abe Silverstein, Director of Headquarter's Office of Space Flight Programs, instructed McDonnell "to focus all further effort to improve Mercury solely on the two-man approach" (Hacker and Grimwood 1977:47). By August 1961, STG was endorsing the Titan II as the rocket to carry the new vehicle to space.

With the spacecraft on solid ground, NASA still needed a program in which to use the vehicle. In recent months, the idea of rendezvous gained interest throughout NASA; now, "whether rendezvous would be as simple and useful in practice as it appeared to be in theory was a question that Mercury Mark II might well be able to answer" (Hacker and Grimwood 1977:53). In addition, more thought was being put into the effects of an extended stay in space on the human body, which would be required for any manned missions to the Moon, and the use of a paraglider for landings. On August 8, 1961, NASA representatives made contact with the Lockheed Missiles and Space Company about using its Agena vehicle as a rendezvous target.

These initial ideas culminated in a "Preliminary Project Development Plan for an Advanced Manned Space Program Utilizing the Mark II Two Man Spacecraft," issued on August 14, 1961. This plan outlined six objectives, which were to be achieved in 10 flights between March 1963 and September 1964. The six goals included long-duration flights, a study of the Van Allen radiation belts, controlled landing, rendezvous and docking, astronaut training, and extensive use of vehicles and equipment already on hand (Hacker and Grimwood 1977). On October 27, 1961, a revised plan was issued, which retained all the original goals except for the Van Allen Study and the focus on using existing hardware; the program also was extended to 12 flights. Further revisions and negotiations with the DoD delayed the project, and finally, on December 8, 1961, NASA approved the final "Project Development Plan for an Advanced Manned Space Program Utilizing the Mark II Two Man Spacecraft" (Launius 2008). On January 3, 1962, the new program was officially redesignated Project Gemini (Grimwood and Hacker 1969).

As the intermediate step between Project Mercury and the Apollo Program, the primary objective of Project Gemini was to prepare for a lunar landing. Its established goals were to keep a two-man crew in space for up to 14 days; rendezvous and dock with orbiting vehicles, and maneuver the combination; and to perfect methods of entering the atmosphere and landing (NASA KSC 2000). In addition, NASA desired to gain additional information on the effects of weightlessness on humans; and the Flight Operations Division planned on honing new skills in mission planning and control.

Altogether, Project Gemini flew 12 missions, all of which launched from LC 19 at CCAFS. The first two missions were unmanned development flights. The focus of Gemini I, April 8, 1964, was to prove that the Titan II could successfully launch the Gemini spacecraft and put it in orbit (Hacker and Grimwood 1977). Gemini II, which occurred on January 19, 1965, had as its major objectives demonstrating the adequacy of the spacecraft reentry module's heat protection, the

structural integrity of the spacecraft from liftoff through reentry, and the satisfactory performance of spacecraft systems (Grimwood and Hacker 1969).

The first manned mission, Gemini III, occurred on March 23, 1965, with astronauts Virgil I. "Gus" Grissom as command pilot and John W. Young as pilot. This three-orbit mission focused on testing the maneuverability of the spacecraft, as Grissom and Young changed the shape of their orbit, shifted from their orbital plane, and dropped to a lower altitude by firing the vehicle's thrusters. Another objective of the mission was to demonstrate the ability to control the flight reentry path. Although the landing accuracy of the vehicle proved to be lower than anticipated, the first Gemini manned flight was considered a success that set-up the more complicated missions yet to come (Grimwood and Hacker 1969).

Photo 2. Launch of Gemini III from LC 19, March 23, 1965.
Source: Johnson Space Center, S65-14150, http://images.jsc.nasa.gov/lores/S65-14150.jpg.

The launch of Gemini IV on June 3, 1965, marked the beginning of the first four-day flight of the U.S. Manned Space Program; landing occurred on June 7. Initially, the astronauts, James A. McDivitt and Edward H. White II, were to fly in formation with the second stage of the Titan II booster after separation. The attempt was unsuccessful, as the astronauts proved that the intended method, aiming the thrusters towards the target, would not work. However, during the mission, White successfully completed the first extravehicular activity (EVA), or spacewalk, by an American (Grimwood and Hacker 1969). Gemini V, launched August 21, 1965, was an eight-day mission conducted by L. Gordon Cooper, Jr. and Charles "Pete" Conrad, Jr. Scheduled to perform a practice rendezvous with a "pod," electrical problems forced a cancellation of the experiment. Instead, Cooper and Conrad maneuvered the vehicle to a predetermined position, in effect completing a "phantom rendezvous" (Grimwood and Hacker 1969).

The goal of Gemini VI, scheduled to launch in October 1965, was to be the first rendezvous and docking mission of the program. The mission plan called for the launch of an unmanned Agena target vehicle by an Atlas rocket, followed by the launch of the manned Gemini vehicle. The Gemini VI astronauts, Walter M. Schirra, Jr. and Thomas P. Stafford, Jr., would catch up to the

Agena target from a lower orbit, and then manipulate their vehicle for rendezvous. On October 25, 1965, the Agena/Atlas combination was launched from LC 14 at CCAFS; however, shortly afterwards, mission control lost all telemetry signals from Agena and cancelled the launch of Gemini VI. Although the mission was considered a failure, three days later with the approval of the White House, NASA announced that the mission would be redesignated Gemini VI-A, and would rendezvous with another manned vehicle, Gemini VII (Grimwood and Hacker 1969; Hacker and Grimwood 1977).

On December 4, 1965, Gemini VII launched with astronauts Frank Borman and James A. Lovell, Jr. for a 14-day mission, meant to solve problems of long-duration spaceflight. For 11 days, Borman and Lovell performed various in-flight experiments, including the evaluation of a new, lightweight spacesuit. On December 15, Gemini VI-A launched from CCAFS and proceeded to track down the orbiting Gemini VII vehicle. Rendezvous was completed that afternoon, when Schirra piloted his capsule to within one foot of the other, and the two flew in formation around each other for five hours. Gemini VI-A landed on December 16, followed two days later by Gemini VII (Grimwood and Hacker 1969).

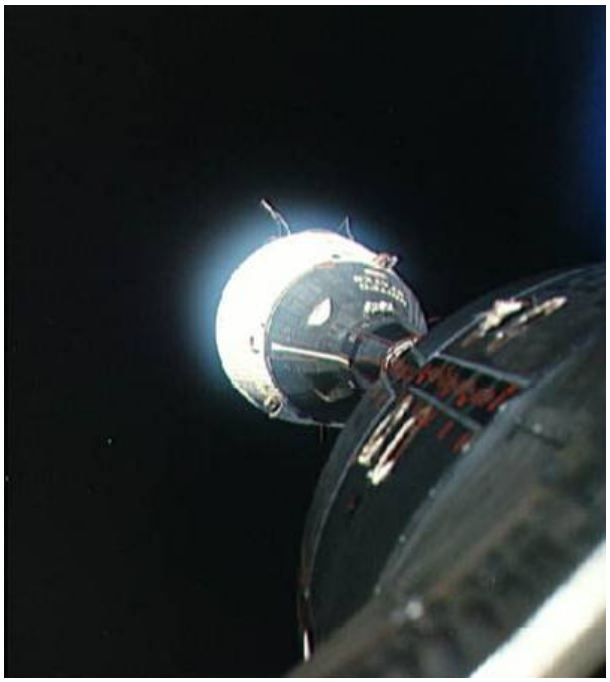

Photo 3. Rendezvous of Gemini VI-A (bottom right) and Gemini VII (center), December 5, 1965. Source: Johnson Space Center, S65-63171, http://images.jsc.nasa.gov/lores/S65-63171.jpg.

Gemini VIII, with astronauts Neil A. Armstrong and David R. Scott, launched on March 16, 1966; less than six hours after launch, it became the first vehicle to rendezvous and dock to a prelaunched Agena target vehicle. Unfortunately, one of Gemini's thrusters became stuck, causing the docked vehicles to roll continuously. Armstrong undocked his vehicle from the Agena, but could only fix the thruster by using the reentry control thrusters; thus, Gemini VIII was forced to make an emergency return to Earth just 10 hours after launch (Grimwood and Hacker 1969). Gemini IX, which launched with Thomas P. Stafford, Jr. and Eugene A. Cernan on June 3, 1965, was supposed to have docked with a modified Agena, but the failed release of its protective shroud caused a cancellation of the objective. Cernan did, however, complete an EVA (Grimwood and Hacker 1969).

Gemini X launched on July 18, 1966, carrying astronauts John W. Young and Michael Collins. During their four-day mission, Young and Collins rendezvoused and docked with their Agena target in low orbit, and then maneuvered their spacecraft to a higher orbit to rendezvous with the Agena target from Gemini VIII. While in position, Collins performed an EVA to the second Agena to retrieve a cosmic dust-collecting panel. Gemini XI, with Charles "Pete" Conrad, Jr. and Richard F. Gordan, Jr., launched on September 12, 1966. The astronauts rendezvoused and docked with their target vehicle 85 minutes after launch, and Gordon performed two EVAs. Gemini XII, the last mission of the program, launched on November 11, 1966, with astronauts James A. Lovell, Jr. and Edwin E. "Buzz" Aldrin, Jr. The four-day mission incorporated a rendezvous and docking task with an Agena and three EVAs (Grimwood and Hacker 1969).

2.5 Apollo Program

On May 25, 1961, 20 days following the successful suborbital flight of Alan Shepard, President Kennedy proposed the following historic goal before a joint session of Congress:

> *Now is the time to take longer strides -- time for this nation to take a clearly leading role in space achievement, which in many ways may hold the key to our future on Earth...I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth. No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish* (Launius 2001).

With widespread support, the public and Congress embraced the goal and the program proceeded rapidly to place a man on the Moon.

The Apollo Program had unofficially begun on February 5, 1959, when NASA established the Working Group on Lunar Exploration to formulate a lunar exploration program. Subsequently, a Research Steering Committee was created, which included personnel from the various NASA centers. At its first meeting in May 1959, the committee prioritized various aspects of a space program, which included a manned lunar landing and return to Earth. The concept was further discussed at the committee's second meeting (June 1959) and at its third meeting (December 1959). By the following January (1960), enough progress had been made to bring about the suggestion of a formal name, "Apollo," for the new program, with the goal of landing astronauts on the Moon and returning them safely to Earth. Glennan approved the name on July 25, 1960, and it was subsequently announced at the first NASA-Industry Program Plans Conference three days later. On September 1, 1960, the STG officially created the "Apollo Project Office" (Ertel and Morse 1969).

Altogether, the Apollo Program flew 32 missions, including the initial research/development and qualification flights, the lunar flights, the Skylab application, and the Apollo-Soyuz Test Project. Three different launch complexes were used: LC 34 (seven launches) and LC 37 (eight launches) at CCAFS, and LC 39 (seventeen launches) at KSC (twelve from Pad A and five from Pad B). Of the total 32 flights, 15 were manned, and of the seven attempted lunar landing missions, six were successful. No major launch vehicle failures of either the Saturn IB or Saturn V occurred; however, there were two major command/service module failures, one on the ground (Apollo 1) and one on the way to the Moon (Apollo 13) (NASA 1994).

On July 20, 1969, the goal of landing a man on the moon was achieved when Apollo 11 astronauts Armstrong, Aldrin, and Collins successfully executed history's first lunar landing. Armstrong and Aldrin walked on the surface of the moon for 22 hours and collected 21 kilograms of lunar material. Apollo 17 served as the first night launch in December 1972. An estimated 500,000 people saw the liftoff, which was the final launch of the Apollo Program (NASA 1994).

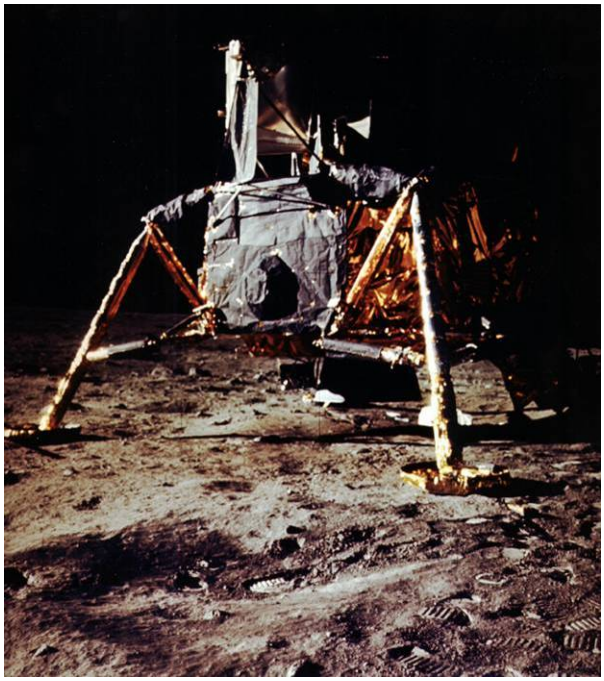

Photo 4. Apollo 11 Lunar Module on the surface of the Moon, July 20, 1969.
Source: Marshall Space Flight Center, MSFC-6901254,
http://mix.msfc.nasa.gov/IMAGES/MEDIUM/6901254.jpg.

2.6 Space Shuttle Program

On January 5, 1972, President Richard M. Nixon delivered a speech in which he outlined the end of the Apollo era and the future of a reusable space flight vehicle, the Space Shuttle, which would provide "routine access to space" (Lindroos 2000). During this speech, President Nixon instructed NASA to proceed with the design and building of a partially reusable Space Transportation System (STS; commonly referred to as the Space Shuttle) consisting of a reusable orbiter, three reusable main engines (SSME), two reusable solid rocket boosters (SRBs), and one non-reusable external liquid fuel tank (ET). NASA selected KSC as the primary launch and landing site for the Space Shuttle Program (SSP). KSC, responsible for designing the launch and recovery facilities, was to develop methods for shuttle assembly, checkout, and launch operations (Ezell 1988; Williamson 1999).

The first orbiter intended for spaceflight, *Columbia* (OV-102*)*, arrived at KSC from Air Force Plant 42, Palmdale, California, in March 1979. Originally scheduled for liftoff in late 1979, the launch date was delayed by problems with both the SSME components as well as the thermal protection system. *Columbia* spent 610 days in the Orbiter Processing Facility, another 35 days in the Vehicle Assembly Building and 105 days on Launch Pad 39A before lifting off on April 12, 1981. STS-1, the first orbital test flight and first SSP mission, ended with a landing on April 14, 1981, at Edwards Air Force Base in California. This launch demonstrated *Columbia's* ability to

fly into orbit, conduct on-orbit operations, and return safely (Jenkins 2001). *Columbia* flew three additional test flights in 1981 and 1982, all with a crew of two. The Orbital Test Flight Program ended in July 1982 with 95 percent of its objectives accomplished. After the end of the fourth mission, President Reagan declared that with the next flight the Shuttle would be "fully operational."

During the SSP, 135 missions were launched from KSC. The Space Shuttle carried a number of planetary and astronomy missions including the Hubble Space Telescope, the Galileo probe to Jupiter, Magellan to Venus, and the Upper Atmospheric Research Satellite. In addition, a series of Spacelab research missions were flown, which carried dozens of international experiments in disciplines ranging from materials science to plant biology. Between 1995 and 1998, NASA conducted a joint U.S./Russian Shuttle-*Mir* Program as a precursor to construction of the International Space Station (ISS). The Shuttle-*Mir* program served to acclimate the astronauts to living and working in space. Many of the activities carried out were types they would perform on the ISS (Rumerman and Garber 2000). Construction of the ISS began in 1998; it was completed in 2011.

Photo 5. Launch of STS-1, *Columbia*, April 12, 1981.
Source: Kennedy Space Center, KSC-81PC-0362, http://mediaarchive.ksc.nasa.gov/search.cfm.

The SSP suffered two major setbacks with the tragic losses of the *Challenger* and *Columbia* on January 28, 1986, and February 1, 2003, respectively. *Challenger* was destroyed 73 seconds after launch due to a faulty O-ring seal in the right SRB; the crew of seven astronauts all perished. *Columbia* was lost on February 1, 2003, following a 16-day mission. The physical cause of the accident was a breach in the thermal protection system on the leading edge of the left wing, caused by a piece of insulating foam, which separated from the ET after launch and struck the wing (CAIB 2003). Sixteen minutes prior to its scheduled touchdown at KSC, the spacecraft broke apart during reentry over eastern Texas and all seven members of the crew perished.

2.7 USAF/DoD Support of NASA's Manned Space Programs

When NASA was established, several Army facilities at CCAFS were given to the agency, including various offices and hangars, as well as LC 5/6, 26, and 34 (Benson and Faherty 1978). In addition, aside from allowing NASA to use various launch complexes and buildings at CCAFS, the USAF (and the DoD in general) would provide launch vehicles, and operational and administrative assistance to this fledgling agency as required.

When Project Mercury first started, DoD support was divided into two phases: operational, which covered the period between the launch and recovery phases, and preoperational, which included all other times. In June 1962, this was revised so that the operational phase was divided into a coordinating phase and an operational control phase. The former extended through the timeframe in which mission plans were developed and resources arranged, as well as astronaut training and simulation exercises; the latter incorporated the timeframe between launch and recovery. The various aspects of support provided by the DoD included launch support, recovery operations, communications network, aeromedical, training, and public information (Davis 1963).

Launch support generally included launch vehicles, the use of the USAF's launch complexes, and assistance with vehicle processing. The Army provided Redstone rockets for the suborbital phase of Project Mercury; the USAF supplied the Atlas rockets for the orbital phase of the program. All of the vehicles launched from CCAFS, LC 5 for the suborbital flights and LC 14 for the orbital flights. Flight vehicle processing, including installations, prelaunch checkouts, and the actual launch commands, for the suborbital missions was provided by the Army Ballistic Missile Agency. The 6555th Aerospace Test Wing of the Space Systems Division of the USAF, which was stationed at Patrick AFB, assisted with vehicle processing for the orbital missions (Davis 1963).

The communications network allowed flight controllers to monitor the status of the vehicle and monitor the condition of, and communicate with, the astronaut. There were 18 worldwide stations, 14 land-based and two USAF tracking ships, as well as two accessory stations. Of these 18 facilities, seven were operated by the USAF, four by NASA, three by the Navy, two by the Army, and two by the Australian Weapons Research Establishment. In addition, relay aircraft were flown by USAF and Naval aviators to assist in spacecraft-to-ground voice relay (Davis 1963; Swenson, Grimwood and Alexander 1966).

Recovery operations included the retrieval of both the astronaut and the spacecraft after a planned or contingency landing; the recovery forces ranged from eight ships and 15 aircraft for the first ballistic launch (MR-1A) and 28 ships and 171 aircraft for the final flight of the program (MA-9). The suborbital flight landings, as well as all but the last two orbital landings, occurred in the Atlantic Ocean. For these operations, Navy ships and aircraft formed the recovery task force, with assistance from USAF aircraft furnished by the Air Rescue Service and the Air Force Missile Test Center. The last two missions of Project Mercury landed in the Pacific Ocean, but there were recovery forces stationed in the Atlantic Ocean as a precaution. For these missions, the Navy provided 15 ships in the Atlantic and 11 in the Pacific; the aircraft were provided by all branches of the U.S. military, including the Coast Guard (Davis 1963).

Photo 6. Recovery operations following Mercury flight MA-9, May 16, 1963.
Source: Marshall Space Flight Center, MSFC-6413216,
http://mix.msfc.nasa.gov/IMAGES/MEDIUM/6413216.jpg.

The DoD also provided aeromedical/bioastronautical support for NASA. This support included administrative, personnel and training, facilities, and equipment. The administrative support consisted of the development of medical plans and programs; the acquisition and preparation of required medical facilities; the requisition, preparation, and deployment of all needed medical personnel and equipment; and the planning of emergency response for an injured astronaut (or non-survival of the astronaut). Throughout Project Mercury, 233 medically trained personnel were provided by the DoD to serve as aeromedical monitors, emergency surgeons, medical assistants, or dietitians; the personnel were stationed at the network tracking stations, CCAFS, on recovery vessels, and in the Bioastronautic Holding Facility within Hangar S (Davis 1963). The medical staff at Patrick AFB supplied the first "nurse to the astronauts," Dolores "Dee" O'Hara, to "get to know the astronauts so well that she would certainly know if they were ill," because the astronauts, being military test pilots, were "not about to tell a flight surgeon when they're sick" (O'Hara 2002:4). DoD facilities for medical support included two modified blockhouses and Hanger S at CCAFS; prefabricated hospitals downrange of the landing sites; and the Wilford Hall USAF Hospital (Texas), U.S. Navy Hospital (Virginia), Walter Reed Army Hospital (Washington, DC), and Army's Tripler General Hospital (Hawaii).

The DoD also assisted NASA with astronaut selection and training. On October 27, 1958, NASA formed a special Committee on Life Sciences to oversee the selection of astronauts; Dr. W. Randolph Lovelace II, a flight surgeon who had served in the Air Force, was appointed as Chairman. The Committee screened the service records of 508 military personnel to find 110 candidates, including 58 Air Force pilots, 47 Navy aviators, and five Marines. In addition, they oversaw the written tests and interviews, as well as the rigorous physical testing at the Lovelace Clinic in Albuquerque, New Mexico and the Aeromedical Laboratory of the Wright Air Development Center in Dayton, Ohio, for physical endurance tests and psychological measurements. From this group, the Committee chose eighteen finalists, from which the "Mercury Seven" were selected by Gilruth, Charles J. Donlan, a senior NASA engineer and Gilruth's assistant, Warren J. North, a NASA test pilot and engineer, and Stanley C. White, an Air Force flight surgeon (Grimwood 1963; NASA no date). The USAF assisted astronaut training

by providing aircraft for the astronauts to maintain their flight proficiency and providing aircraft to simulate zero-g environments. In addition, USAF facilities at Langley Air Force Base, Virginia, CCAFS, and Stead Air Force Base, Nevada, were provided for training activities. U.S. Navy facilities at Johnstown, Pennsylvania, Philadelphia, Pennsylvania, and Pensacola, Florida were also used for centrifuge simulations, and water survival training and revolving room simulations, respectively (Voas 1963).

Finally, during Project Mercury, the DoD provided NASA with logistic support of news media coverage. The USAF constructed a press site near LC 5 for media representatives to have a direct view of the suborbital Redstone launches; a second press site was later built near the CCAFS landing strip, which offered a better view of LC 14 and the orbital Atlas mission launches. The USAF also provided transportation, escorts, communications lines, and a public-address system to assist in the dissemination of information (Davis 1963).

Throughout Project Gemini, the USAF and DoD provided the same support as they had during Project Mercury; in some areas, the support expanded. In general, recovery operations support, public information, and astronaut training remained the same. Launch support during Project Gemini was provided solely by the USAF. DoD support with respect to the communications network changed, as did its bioastronautics support. One additional aspect of support for Project Gemini was in the field of meteorology (Olson 1967).

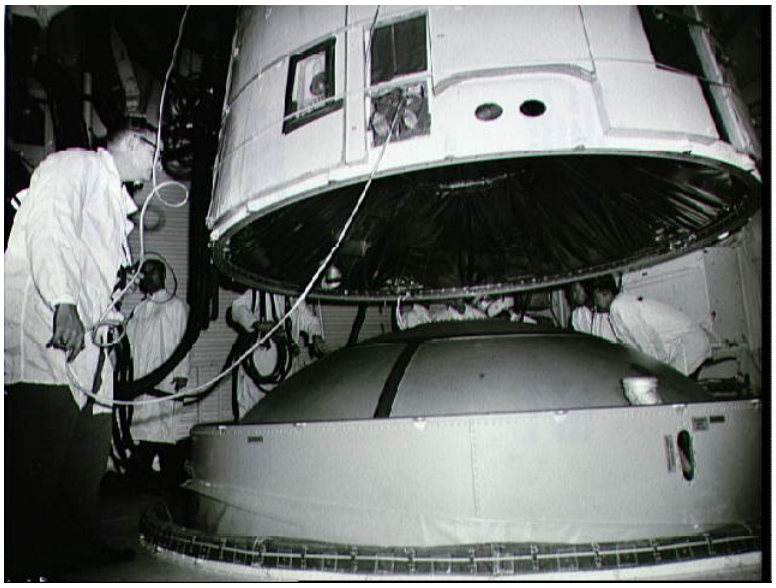

Photo 7. Mating Gemini III spacecraft (top) to Titan II vehicle (bottom), February 17, 1965. Source: Johnson Space Center, S65-17337, http://images.jsc.nasa.gov/lores/S65-17337.jpg

Launch support during this program was mostly provided by the USAF, who gave NASA the use of LC 19 at CCAFS, and provided both the Titan II launch vehicles and the Atlas-Agena target vehicles. As with Project Mercury, the 6555th Aerospace Test Wing assisted with vehicle processing for the missions, including propellant loading, launch pad and range safety, metric and optical tracking, and command and control support for the launches (Hacker and Grimwood 1977; Olson 1967). The communications network for Project Gemini decreased to 17 worldwide stations, 13 land-based and two USAF tracking ships, plus the two accessory stations. Of these 19 facilities, eight were operated by the USAF, eight by NASA, one by the Navy, one by the Army, and one by the Australian Weapons Research Establishment (Olson 1967).

One key difference in bioastronautics support for Project Gemini was the construction of the BOSU, completed in time to support the Gemini III mission (March 23, 1965). This facility included a state-of-the-art surgical suite, complete with areas for major and minor surgery, intensive care, recovery, and an x-ray laboratory. Its medical staff assisted NASA with prelaunch evaluations of the flight crew, biomedical monitoring throughout the mission, medical support during recovery operations, and postflight medical evaluations. Additionally, in March 1963, CCAFS' Office of the Deputy for Bioastronautics was charged by the USAF Surgeon General with developing a curriculum for the third year of residency training in aerospace medicine (Olson 1963).

Meteorology was a new area of DoD support for Project Gemini. With Project Mercury, the longest mission, MA-9, lasted just over 34 hours, requiring little monitoring of weather conditions. Gemini missions, however, would extend up to 14 days, and therefore, the weather at each planned recovery area would have to be continuously monitored to determine its suitability. Both the USAF and Navy provided weather reconnaissance aircraft, which had special equipment for monitoring hurricanes and typhoons. In addition, weather balloons were used at select locations (Olson 1967).

Similar to Projects Mercury and Gemini, DoD support for the Apollo Program included areas of launch and recovery operations, communications, medicine, meteorology, and public affairs. At CCAFS, LC 34 was used for launches involving the Saturn I Block I and the Saturn IB rockets; LC 37 supported launches that utilized the Saturn I Block II and Saturn IB rockets. Apollo 7, launched on October 11, 1968, was the last manned mission to lift-off from CCAFS. Likewise, similar support extended through the Space Shuttle Program. One area that was added during the Shuttle Program was the deployment of USAF aeromedical personnel from CCAFS to Ramstein Air Force Base in Germany whenever a U.S. astronaut returned from the ISS aboard a Russian Soyuz spacecraft (NASA 1975; Benson and Faherty 1978; USSC 2011).

3.0 THE BIOASTRONAUTICS OPERATIONAL SUPPORT UNIT

3.1 History, Functions, and Operations

Circa 1963, the USAF commissioned Steward-Skinner Associates, an architecture firm from Miami, Florida, to design the Bioastronautics Operational Support Unit facility, to be located east of the NASA Parkway East/Hangar Road intersection in the Industrial Area of CCAFS. The facility was originally designed with a surgical suite at the north end, and offices, laboratories, and other support areas at the south end (Steward-Skinner Associates 1964). On February 27, 1964, the construction contract for the facility was let. Construction of the building began in March 1964; it was 93 percent complete by December of that year. On February 16, 1965, the BOSU was accepted by the USAF for beneficial occupancy (Perry 2012). The final layout of the facility (see Figure 2) retained the surgical suite at the north end with support areas at the south end (Steward-Skinner Associates 1965).

Photo 8. BOSU (red arrow) under construction ca. 1964, facing southwest. Yellow arrow denotes heliport. (Kennedy Institutional Imaging Facility, PL64C-82448).

Photo 9. Launch Recovery Support Team (LRST) in the BOSU Conference Room/reference library, facing southwest. (*Ebony* 1966:53).

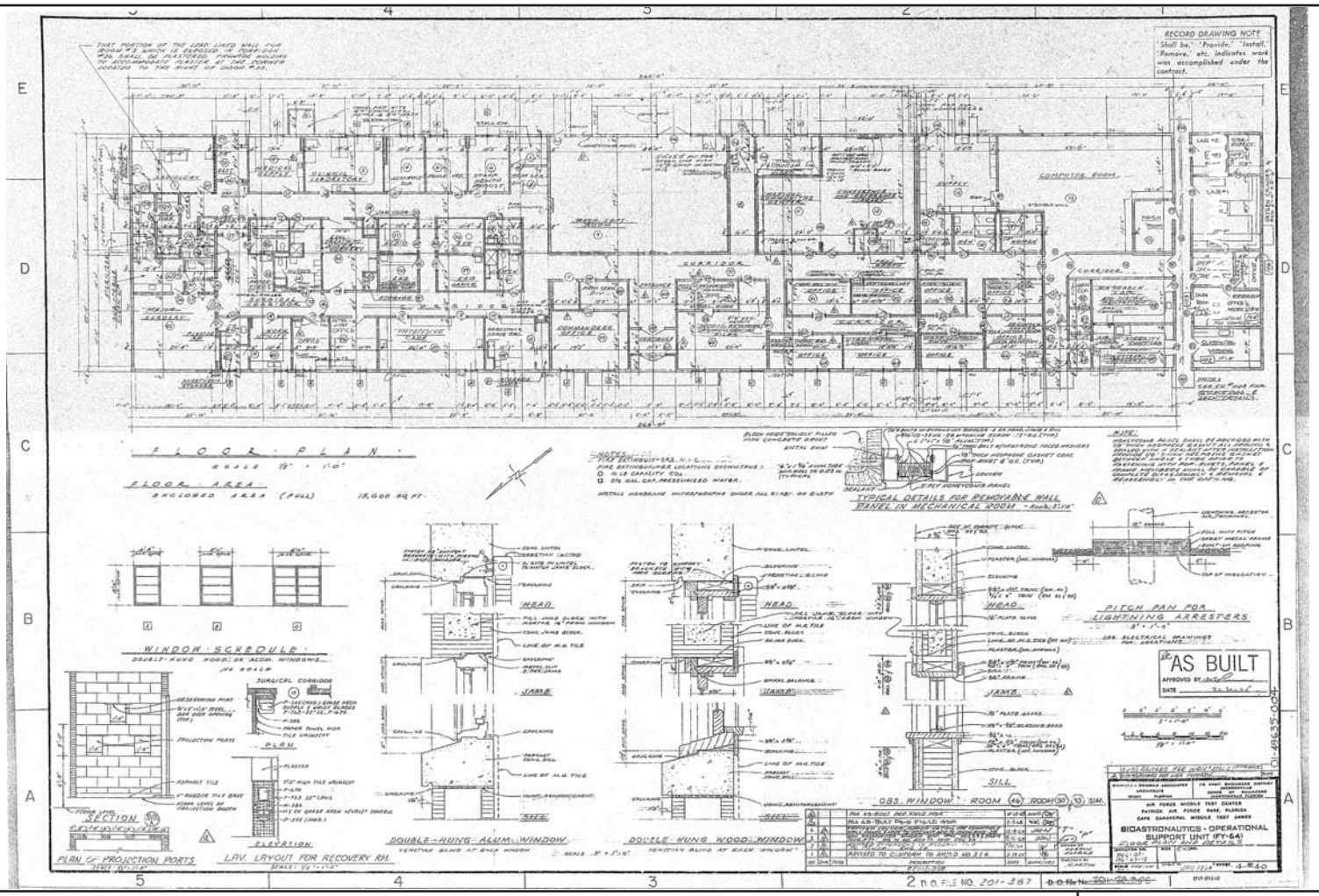

Figure 2. 1965 layout of the BOSU (Steward - Skinner Associates 1965).

Once constructed, the BOSU housed the Gemini Launch Site Recovery Command Post, as well as a completely equipped surgical suite; an associated heliport was situated to its east (Perry 2012). The Command Post was responsible for the LSRT. The LRST, a DoD group of specially trained medics, consisted of a 12-man crew, divided into three teams of four for each manned spacecraft launch. In the case of an emergency during a manned spacecraft launch, the LRST would recover the astronauts from the launch pad, carry them to safety, administer emergency medical assistance, and transport them to the BOSU (*Ebony* 1966; NASA 1966). The BOSU also hosted a five-week residency for nurses enrolled in the Aerospace Nursing Course of the USAF's Space Nursing Program (Czerwinski, Plush, and Bailes 2000).

On March 23, 1965, the pre-flight physicals for the Gemini III astronauts, Virgil I. "Gus" Grissom and John W. Young, were conducted within the BOSU (Olson 1967). These physicals included temperature, blood pressure, and weight checks; blood and urine analyses; skin examinations; and eye, ear, nose, and throat examinations. These were the only pre-flight physicals of NASA astronauts completed within the facility (O'Hara 2002, 2012).

Between its construction and 1972, the north end of the BOSU served as a hospital, with medical services provided by military doctors. The facility had areas for surgery, X-ray, ear and eye exams, and dental exams. In the south end of the facility were offices for the doctors, as well as laboratories. In addition, there was a computer complex where the Pan American weather group was stationed. This group monitored the weather during planned launch windows, and sent weather balloons into the upper atmosphere to check weather conditions (Fields 2012).

Photo 10. Historic view of recovery room, facing southwest.
(Kennedy Institutional Imaging Facility, PL66C-76979).

Just after midnight on January 28, 1967, following the fire at LC 34, the three Apollo 1 astronauts, Virgil I. "Gus" Grissom, Edward H. White II, and Roger B. Chaffee, were brought to the BOSU. Here, military doctors conducted a post-mortem examination of the bodies, including physical, microscopic, radiographic, and toxicological examinations. In addition, 27 members of the Pad Safety Crew, who had suffered smoke inhalation, contusions, and abrasions, were examined at the BOSU; two were kept overnight for observation (ARB 1967; NASA KSC 1967).

On December 19, 1972, ownership of the BOSU was officially transferred to NASA KSC and the facility became known as the Dispensary. At this time, the facility was being used by Pan American, NASA's contractor for medical and environmental health services per contract NAS10-7448. The building housed 18 occupational medical and environmental health personnel, and seven employees of the U.S. Public Health Services, as well as an environmental monitoring group. The facility, capable of supporting medical exams and X-ray imaging, was anticipated to accommodate 1,110 patients each month (Clark 1972; NASA KSC 2012). The medical services were contained within the east side of the north area of the BOSU; the health physics operations were within the west side of the north area. The middle area of the building held office spaces for the environmental health group. Environmental health supported manned and unmanned launches by NASA, as well as military missions operated by CCAFS (Martin 2012).

At the south end, a quarantine lab was established by the environmental monitoring group, which verified the cleanliness of both unmanned and manned spacecraft set to launch. The process included testing air and surface samples of the interior of the vehicle taken by laboratory technicians (Fields 2012). In particular, a Planetary Protection Laboratory was established for NASA Jet Propulsion Laboratory's Viking mission to Mars. This lab validated the sterilization cycle of the Viking spacecraft, to ensure the number of microorganisms on the spacecraft met Planetary Protection requirements to prevent contamination of Mars by organisms from Earth (Bergstrom 2012). Similar activities were conducted through the lunar missions of Apollo, and throughout the SSP; the lab created microbial profiles of the High Bay in the Operations and Checkout Building and Vehicle Assembly Building in preparation of payloads that were to be carried aboard the Shuttle (Fields 2012; Bergstrom 2012).

In 1975, the original computer room was subdivided into three rooms; by 1983, modifications were made to the original conference room, which decreased its square footage (NASA KSC 2012). In 1980, the environmental health unit moved from the BOSU to KSC; the medical clinic and environmental monitoring group remained. As the Space Shuttle Program gained momentum, the environmental monitoring group conducted environmental surveys and animal surveys throughout KSC (Martin 2012). These surveys included geographic information systems mapping, weather analysis, attempts to predict the direction of the launch cloud and how its concentration of acid would affect plants and wildlife, and the set-up of drinking water tanks on the Shuttle. The laboratory also tested the drinking water throughout CCAFS and KSC, assisted with crop growing experiments, integrated life sciences experiments on the Shuttle, and provided ground control for those experiments (Sumner 2012). Also included in the south area was a clinical microbiology lab, which would analyze samples from the astronauts, and provide occupational health wellness checks (Sumner 2012).

In 1992, a 2,250-square foot, four-room addition was constructed at the southeast end of the facility (NASA KSC 2012). One of the rooms was a mechanical equipment room; the other three formed a suite of laboratories. Within this suite, one room served as a generic work area, one was an organic chemistry lab, and the third was an inorganic chemistry lab (Sumner 2012). Since the 1992 addition, no other alterations have been made to the BOSU that have changed its layout (see Figure 3). However, some of the rooms received new paint and carpeting, in place of the original floor tiles.

In 2003, the medical clinic was removed from the BOSU, the Health Physics group moved back to the building, taking the entire north area; at this time, the facility was renamed the Environmental Health/Health Physics Facility (Martin 2012; NASA KSC 2012). The environmental monitoring and research area remained situated at the south end of the building. This area presently contains microbiology and chemistry labs, as well as rooms for processing

Self Contained Atmospheric Protective Ensemble equipment (Hall 2012). The Health Physics area is within the north end of the BOSU. This area continued to serve as a clinic until ca. 2007; currently, the area is used for analyzing radioactive materials (Nickell 2012).

3.2 Facility Description

The BOSU is a one-story, Masonry Vernacular style building with approximate overall dimensions of 324 feet (ft) in length (north-south), 60 ft in width (east-west), and 13 ft in height (Photo 9). The entirety sits on a reinforced poured concrete slab foundation, supported by reinforced poured concrete piers and footers. The walls are comprised of concrete block, and topped with a slightly gabled roof that rests on steel joists.

The west elevation of the BOSU serves as the principle façade of the building. The main entrance is just north of center, and is comprised of one set of double glass doors, with glass sidelights and transoms, inset 4 ft. The wall surface surrounding the door is faced with exposed aggregate facing block, as is 10 ft of the main wall on either side. The windows to the north of the main entrance are individual, two-over-two metal double hung sash; to the south of the main elevation, there are both individual and paired two-over-two metal double hung sash windows. Additionally, near the south end of the west elevation are two double, one-light aluminum swing doors with a glass transom. There are four similar doorways on the east elevation, as well as individual and paired two-over-two metal double hung sash windows. There are no openings on the north elevation; the only opening on the south elevation is a ventilation louver.

Photo 11. West elevation of the BOSU, facing southeast.

Internally, the room arrangement is based on a double-loaded corridor plan, and is divisible into north and south areas. As originally constructed, the medical examination rooms and surgical rooms were located at the north end of the facility (see Figure 2). Specific rooms were designated for major surgery; evaluation, treatment, and minor surgery; radiology; recovery and intensive

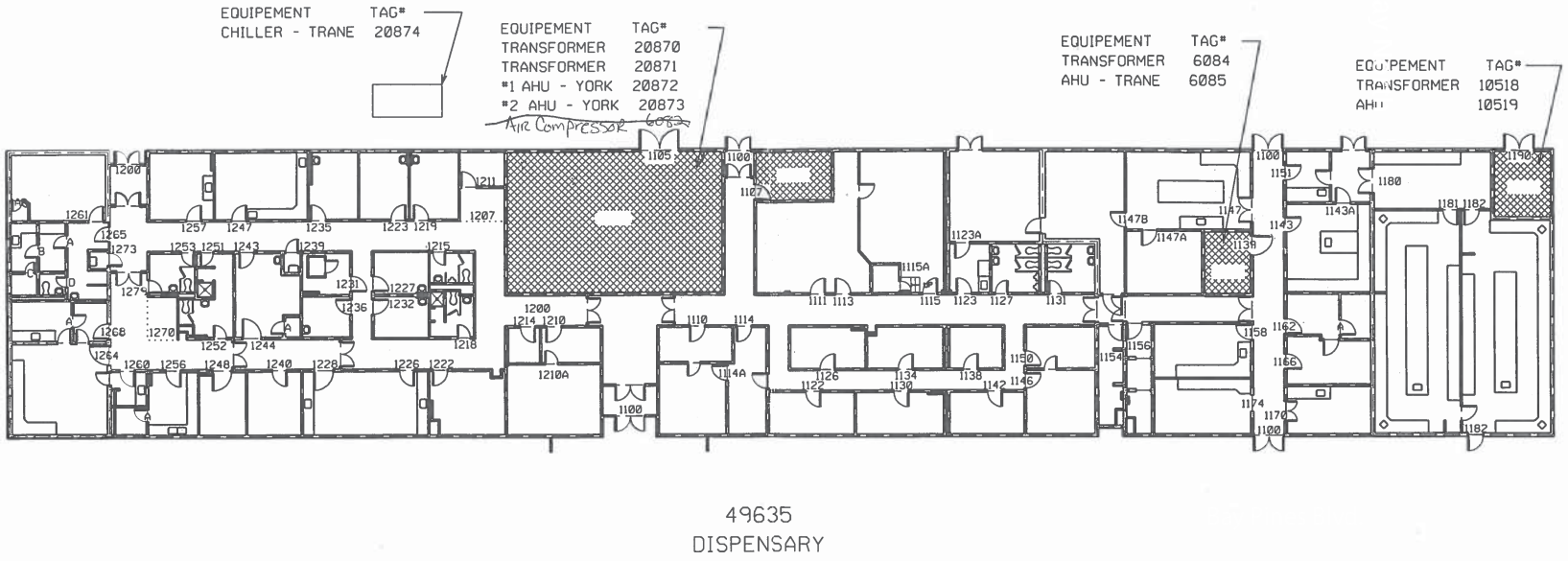

Figure 3. Circa 2000 layout of the BOSU (NASA KSC 2012).

care; audio, EKG, and eye examinations; and physician offices (Steward-Skinner Associates 1965). This area of the BOSU retains its original layout, and many of these spaces still have their original tile walls and floors. In addition, many of the rooms retain original furnishings, such as built-in stainless steel cabinetry, X-ray viewers and storage shelves, oxygen connections, and curtain lines.

Photo 12. View of major surgery area, facing north.

Photo 13. Detail of the original sterilizer, facing northeast.

Photo 14. View of X-ray processing area, facing east.

Photo 15. View of Evaluation, Treatment, and Minor Surgery Room, facing southwest.

The south end of the facility originally had support areas for the BOSU team. Specific areas included a conference room/reference library, a medical communications center, a supply room, a bioinstrumentation lab, offices for medical personnel, and research laboratories. Also in the south end of the facility was a computer room for the meteorology group and offices for meteorological personnel (Steward-Skinner Associates 1965; Fields 2012). These areas generally had gypsum board or exposed concrete block walls, tile floors, and gypsum board ceilings. While most of the walls and ceilings remain intact, the floors have been changed to carpet or modern tile. In

addition, some of the rooms in this part of the building, such as the conference room and computer room, have been altered from their original layout, and much of the original furniture has been replaced with modern furniture.

Photo 16. View of the conference room/reference library, facing northeast.

Photo 17. View of Room 1147, facing southeast.

4.0 EVALUATION OF SIGNIFICANCE

The BOSU is considered individually eligible for listing in the NRHP under Criterion A, in the area of Space Exploration. Because the facility is less than 50 years in age, Criteria Consideration G applies. The BOSU demonstrates one of the roles the USAF played in the U.S. Manned Space Program. Its period of significance is considered to be from 1964, when it was designed, through 1972, when the building was transferred to NASA for use as an occupational health clinic.

The BOSU was constructed by the USAF between 1964 and 1965 to house the Launch Site Recovery Command Post for the LSRT, as well as a completely equipped surgical suite. The LSRT was a group of military personnel, specially trained to rescue astronauts in the event of an emergency during the launch sequence. The team would carry the astronauts from the launch pad to the BOSU, where doctors were capable of providing medical treatment to the astronauts within the surgical suite. Although no emergencies ever occurred during a manned spaceflight launch, the BOSU housed a vital service to the U.S. Manned Space Program. In addition, it served as the location where the Apollo 1 astronauts were first taken following the fire within their capsule during a simulation at LC 34.

The BOSU derives its primary significance from the surgical suite, located at the north end of the building. This area of the BOSU retains its original layout, and many of these spaces still have their original tile walls and floors. In addition, many of the rooms retain original furnishings, such as built-in stainless steel cabinetry, X-ray viewers and storage shelves, oxygen connections, and curtain lines. With regard to the south end of the facility, while most of the walls and ceilings remain intact, the floors have been changed to carpet or modern tile. In addition, some of the rooms in this part of the building, such as the conference room and computer room, have been altered from their original layout, and much of the original furniture has been replaced with modern furniture. Overall, the BOSU does retain a great deal of integrity of location, design, setting, materials, workmanship, feeling, and association.

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1963 "Project Review." *Mercury Project Summary Including the Results of the Fourth Manned Orbital Flight, May 15 and 16, 1963 [SP-45]*. NASA, Office of Scientific and Technical Information, Washington, DC.

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APPENDIX A: SHPO Correspondence

FLORIDA DEPARTMENT of STATE

RICK SCOTT
Governor

KEN DETZNER
Secretary of State

Ms. Barbara A. Naylor
Kennedy Space Center
National Aeronautics and Space Administration
Kennedy Space Center, FL 32899

May 9, 2012

RE: DHR Project File Number: 2012-2030
Historic Evaluation and Survey of Facility #49635/Environmental Health/Health Physics (aka Bioastronautics Operation Support Unit/BOSU) and Demolition of the Property (8BR2905)
Cape Canaveral Air Force Station, Brevard County

Dear Ms. Naylor:

This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, on the *National Register of Historic Places.* The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and in accordance with the 2009 *Programmatic Agreement (Programmatic Agreement Among the National Aeronautics and Space Administration, John F. Kennedy Space Center, Advisory Council on Historic Preservation, and the Florida State Historic Preservation Officer Regarding Management of Historic Properties at the Kennedy Space Center, Florida).*

Based on the information provided, this office concurs with your determination that the BOSU facility appears to meet the criteria for listing in the *National Register* and that the proposed demolition would constitute an adverse effect on the historic property in accordance with Stipulations II.C.1 of the above referenced programmatic agreement.

We note that NASA Kennedy Space Center has agreed to document the BOSU facility according to Stipulation V. This office concurs that the recordation will adequately mitigate the adverse effects. We look forward to receiving and reviewing the completed documentation when it becomes available.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *scott.edwards@dos.myflorida.com*, or at 850.245.6333 or 800.847.7278.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

OFFICIAL

National Aeronautics and Space Administration

Kennedy Space Center
Kennedy Space Center, FL 32899

April 4, 2012

Reply to Attn of: TA-A4C

Florida Division of Historical Resources
Attn: Laura Kammerer
500 S. Bronough Street
R. A. Gray Building
Tallahassee, Florida 32399-0250

Subject: Historic Evaluation and Survey of Facility #49635/Environmental Health/Health Physics (also known as the Bioastronautics Operations Support Unit/BOSU) and Demolition of the Eligible Property (8BR2905) at the Cape Canaveral Air Force Station

As part of the Center-wide 45-50 Year Historic Survey and the Construction of Facilities 2012 Demolition Projects, Facility #49635/Environmental Health/Health Physics was surveyed on February 15, 2012, by the National Aeronautics and Space Administration Kennedy Space Center (NASA KSC) and Archaeological Consultants Inc. (ACI). The scope of the work was to evaluate the facility, also known as the BOSU (Bioastronautics Operations Support Unit), for National Register of Historic Places (NRHP) eligibility. The survey consisted of an on-site facility assessment, including digital photographs of exterior and interior areas, research at the KSC Archives, Real Property Office, and the Air Force Space and Missile Museum, and interviews with Facility Manager(s) and other pertinent personnel regarding the history and use of the building.

NASA KSC has determined that Facility #49635 (located on the Cape Canaveral Air Force Station and owned by NASA KSC, see map) be individually eligible for listing in the NRHP. The facility was constructed by the U.S. Air Force between 1964 and 1965 and housed the Launch Site Recovery Command Post for the Launch Site Recovery Team, as well as a completely equipped surgical suite. The Launch Site Recovery Team was a group of military personnel, specially trained to rescue astronauts in the event of an emergency during the launch sequence. The team carried the astronauts from the launch pad to the facility where doctors were capable of providing medical treatment to them within the surgical suite.

Although no emergencies ever occurred during a manned spaceflight launch, the facility housed a vital service to the Manned Space Program. In addition, it served as the location where the Apollo 1 astronauts (Virgil I. 'Gus' Grissom, Edward H. White II, and Roger Bruce Chaffee) were taken following the fire within their capsule during a simulation at Launch Complex 34.

Facility #49635 (8BR2905) is considered eligible under Criterion A in the area of Space Exploration by demonstrating the role that the U.S. Air Force played in the U.S. Manned Space Program. Its period of significance is considered to be from 1964, when it was designed, through 1972, when the building was transferred to NASA for use as an occupational health clinic. The facility derives its primary significance from the surgical suite, located at the northwest end of the building, which maintains a high degree of integrity with regard to location, design, setting, materials, workmanship, feeling, and association. Most rooms in the surgical suite retain their original tile walls and floors, as well as stainless steel cabinetry (see photos). The integrity of the remainder of the building, however, has been compromised due to the introduction of modern cabinetry and laboratory equipment, as well as alterations to room layouts completed after the period of significance.

NASA KSC acknowledges that the demolition activities are considered an "*adverse effect*" to the eligible historic property pursuant to KCA-4185, *Programmatic Agreement for Management of Historic Properties at KSC,* under Stipulation II. C. 1. Categories of Undertaking. To mitigate the "*adverse effects,*" NASA KSC is proposing to perform historic recordation (Level II HABS/HAER: Historic American Building Survey/Historic American Engineering Record) under Stipulation V. A. Recordation. Regarding Stipulation V. B., Salvage and/or Artifacts, prior to demolition activities, if any items are identified as an "*artifact*" for preservation or future display purposes, those items will be made available through the NASA GSA Portal System and/or disposed of appropriately through the KSC Disposal Process.

NASA has been mandated to reduce their real property assets at each of the Centers to meet the future space-related program demands and commercial requirements; therefore, Facility #49635, an occupational health facility, was determined not significant for reuse and is no longer needed to support future programs at KSC. The facility was also offered back to the U.S. Air Force and they have declined for future reuse (see letter) and are currently undergoing the same exercise to reduce footprint at their bases.

A letter was forwarded to nine Interested Parties (e.g., U.S. Spacewalk of Fame, North Brevard Historical Society, Air Force Space and Missile Museum, Brevard County Historical Commission, Apollo One Memorial Foundation, North Brevard Heritage Foundation, 45th Air Force Space Wing, Fish & Wildlife Services, and Canaveral National Seashore) for comments on the demolition activities for the eligible historic property (Facility #49635) and the Advisory Council on Historic Preservation was also notified under Stipulation III. Consultation, paragraphs B4 and B, respectively.

Upon completion of the final historic survey and evaluation report of Facility #49635, estimated to be completed in May, a Florida Master Site File and Survey Log will also be submitted to your office. In the interim and to facilitate the fast-track demolition activities scheduled for this year, NASA KSC requests your concurrence to proceed.

If you have any questions, please contact me at (321) 867-8452 or Nancy English at (321) 867-6987.

Barbara A. Naylor
KSC Historic Preservation Officer

5 Enclosures:
1. Map of Location
2. Floorplan of Facility
3. Photographs, Exterior/Interior
4. ACI's Letter to NASA KSC
5. Letter from Air Force to NASA KSC

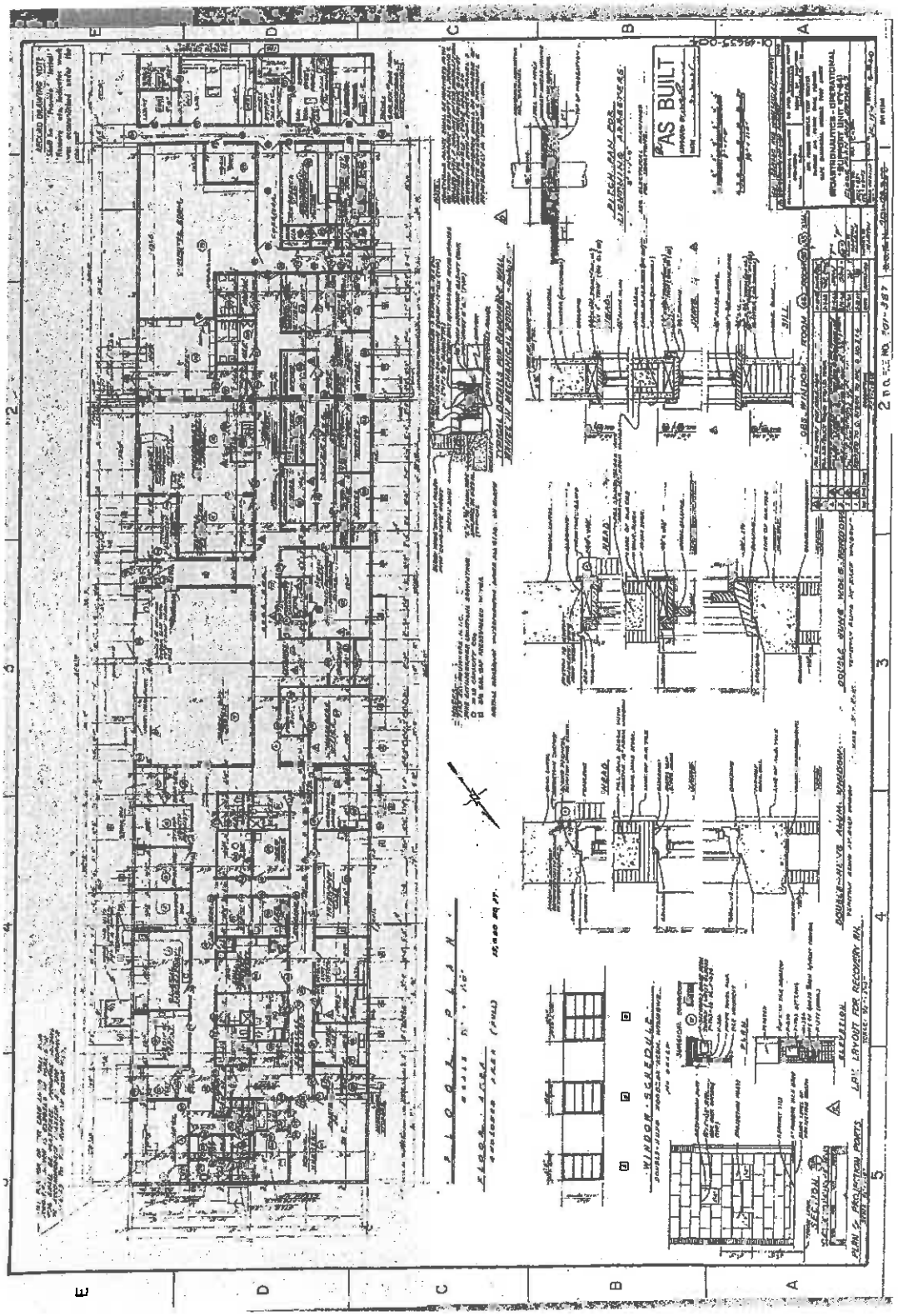
cc:
ACHP/Tom McCulloch
CCAFS/Tom Penders
HQS FPO/Jennifer Groman
KSC/CC/Tracy Belford
KSC/TA-B4C/Sheryl Chaffee
KSC/AA-D/Trey Carlson
KSC/TA-B3A/Sonia Miller
KSC/TA-B3C/Miroslava Guisbert
KSC/EX-P1/Luis Berrios
KSC/ TA-A5A-1/Chris Spears
Spacewalk of Fame
North Brevard Historical Society
Air Force Space and Missile Museum
Brevard County Historical Commission
Apollo One Memorial Foundation
North Brevard Heritage Foundation
CCAFS/MS-9125/Tom Penders

Map of Location

Facility #49635 / BOSU

Enclosure 1

Floorplan of Facility #49635



Enclosure #2

Photographs of Facility #49635

Exterior, Facility #49635

Interior View

Enclosure #3

Interior Views

Enclosure #3

ACI's Letter to NASA KSC

ARCHAEOLOGICAL CONSULTANTS INC.
Florida's First Choice in Cultural Resource Management

March 29, 2012

Ms. Barbara A. Naylor
Historic Preservation Officer
John F. Kennedy Space Center
Mail Code TA-B1C
Kennedy Space Center, FL 32899

ARCHAEOLOGICAL SURVEYS AND EXCAVATIONS

HISTORIC BUILDING SURVEYS AND EVALUATIONS

ARCHIVAL RESEARCH

CULTURAL RESOURCE ASSESSSMENTS

NATIONAL REGISTER NOMINATIONS

INTERPRETIVE DISPLAYS

PRESENTATION PLANNING

A MEMBER OF ACRA

Subject: Historic Evaluation and Survey of Facility 49365/Environmental Health/Health Physics Facility (BOSU)
IHA-BOA-09-009-A, Task Order No. 019

Dear Ms. Naylor:

On February 15, 2012, Archaeological Consultants, Inc. (ACI) initiated work on the subject project, in accordance with Section 110 of the National Historic Preservation Act of 1966, as amended. The purpose of this task work order is to evaluate the significance of Facility 49365/Environmental Health/Health Physics Facility (BOSU) in terms of the criteria of eligibility for listing in the National Register of Historic Places (NRHP). To date, ACI has completed on-site survey of the facility, including digital photography of the exterior and interior, research at the KSC Archives and Real Property Office; and research at the Cape Canaveral Air Force Museum. Interviews with the facility managers and other personnel regarding the history and use of the facility are still on-going, as is the attempt to locate historical photographs at KSC repositories.

In accordance with the Scope of Services, a draft report, which will contain the relevant context, history, description and statement of significance for the Facility 49365/Environmental Health/Health Physics Facility (BOSU); plus a Florida Master Site File (FMSF) Form and Survey Log, will be submitted by the end of May 2012, for your review. In the interim, and to facilitate your long-range planning efforts, based upon the results of on-site survey and research to date, ACI considers Facility 49365 (FMSF No. 8BR2905) to be individually eligible for listing in the NRHP.

Facility 49365, originally named the Bioastronautics Operational Support Unit (BOSU), was constructed by the U.S. Air Force (USAF) between 1964 and 1965. It housed the Launch Site Recovery Command Post for the Launch Site Recovery Team, as well as a completely equipped surgical suite. The Launch Site Recovery Team was a group of military personnel, specially trained to rescue astronauts in the event of an emergency during the launch sequence. The team would carry the astronauts from the launch pad to Facility 49365, where doctors were capable of providing medical treatment to the astronauts within the surgical suite.

Enclosure #4

Although no emergencies ever occurred during a manned spaceflight launch, Facility 49365 housed a vital service to the manned space program. In addition, it served as the location where the Apollo 1 astronauts were first taken following the fire within their capsule during a simulation at Launch Complex 34. It is considered eligible under Criterion A in the area of Space Exploration, by demonstrating the role the USAF played in the U.S. Manned Space Program. Its period of significance is considered to be from 1964, when it was designed, through 1972, when the building was transferred to NASA for use as an occupational health clinic. The facility derives its primary significance from the surgical suite, located at the northwest end of the building, which maintains a high degree of integrity with regard to location, design, setting, materials, workmanship, feeling, and association.

In the event that the adverse effects of proposed alterations to this historic property cannot be avoided, ACI recommends contacting the Florida State Historic Preservation Officer to determine the appropriate mitigation measures, in accordance with Stipulation V.A of the KSC's Programmatic Agreement (PA) Regarding Management of Historic Properties, dated May 18, 2009.

Thank you for the opportunity to be of professional service. If you have any questions, or need additional information, please do not hesitate to call.

Sincerely,

Patricia Slovinac, MA
Senior Architectural Historian

Cc. Jane Provancha, IHA
Joan Deming, RPA, ACI

Enclosure #4

DEPARTMENT OF THE AIR FORCE
45TH SPACE WING (AFSPC)

MEMORANDUM FOR NASA TA-B4C
KENNEDY SPACE CENTER FL 32899

FROM: 45 CES/CC
1224 Jupiter Street MS 9125
Patrick AFB FL 32925

SUBJECT: Intent to Vacate and Abandon NASA Real Property on Cape Canaveral Air Force Station (CCAFS) Florida (Ref. your letter, same subject, 26 Aug 11)

1. Our staff has reviewed the facilities identified as excess in the referenced memo and determined Facilities 49635, 49635-1, 15730, 15830, 54945, 49637 and 66200 are not required to support mission or consolidation initiatives and request NASA demolish these facilities. In addition, we request that NASA prepare an exit Environmental Baseline Survey (EBS) upon completion of demolition of these structures.

2. We are investigating the potential reuse of Facility 60650, E&O Building and require additional time to complete our evaluation and obtain wing approval. With your concurrence we will have a decision by 29 Feb 12. Should facility 60650 fit into our future consolidation plans, we would consider executing a permit concurrent with the GSA transfer process. As is typical with a permit, the Air Force would pay all costs for facility operations and maintenance during its term. However, several issues need to be addressed prior to a final decision on the matter of permit and/or transfer of this facility.

a. If the Air Force is required to pay full cost to obtain the facility it is unlikely we would proceed with a real property transfer.

b. The Air Force cannot agree to demolition responsibility as you have proposed as part of the permit as the asset would not be ours to demolish.

c. As the facility is currently on Air Force property, an exit Environmental Baseline Survey should be initiated by NASA upon vacating the facility and provided to this office.

3. My point of contact for this action is Mr. Cecil O'Bryan. He can be reached at 853-5545 or E-mail cecil.obryan@patrick.af.mil.

SUSAN M. RIORDAN-SMITH, Lt Col, USAF
Commander

GUARDIANS OF THE HIGH FRONTIER

Enclosure #5

BACKGROUND INFORMATION

(FL SHPO letter to NASA KSC regarding Facility #49635)

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Barbara A. Naylor
Historic Preservation Officer
Kennedy Space Center
National Aeronautics and Space Administration
Kennedy Space Center, FL 32899

November 22, 2011

RE: DHR/SHPO Project File Number: 2011-5026
NASA Reference Number: TA-A4C
Proposed Demolition of Twenty-two Facilities at Kennedy Space Center – Design Package One (FY 2012)
John F. Kennedy Space Center, Brevard County

Dear Ms. Naylor:

This office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*.

We have reviewed your list of 22 resources and concur that 21 of these facilities do not appear to meet the criteria for listing on the *National Register* and the proposed demolitions will have no effect on historic properties.

However, Facility 49635 may be associated with potential historic district. Therefore, it is the opinion of this office that the facility needs to be evaluated by a professional historical or architectural cultural resource firm and be resubmitted.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *scott.edwards@dos.myflorida.com*, or at 850.245.6333 or 800.847.7278.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office
(850) 245.6300 • FAX: 245.6436

☐ Archaeological Research
(850) 245.6444 • FAX: 245.6452

☑ Historic Preservation
(850) 245.6333 • FAX: 245.6437

National Aeronautics and Space Administration
Kennedy Space Center
Kennedy Space Center, FL 32899

October 17, 2011

Reply to Attn of: TA-A4C

Florida Division of Historical Resources
Attn: Laura Kammerer
500 S. Bronough Street
R. A. Gray Building
Tallahassee, Florida 32399-0250

Subject: Demolition of Additional Facilities at Kennedy Space Center, Design Package One (FY 2012)

Ref: Ltr from NASA KSC to FL SHPO, dated October 23, 2010
Ltr from FL SHPO to KSC, dated November 18, 2010 (DHR Project File Number 2010-5379)

NASA is proposing to add twenty-two properties to their Design Package One for demolition in FY 2012 and FY 2013 in support of KSC's footprint reduction levied by the Agency. These properties were constructed between 1965 and 2007 and their functions at KSC supported environmental health/health physics, administrative offices, tanks, Precision Approach Path Indicator (PAPI) lights, tracker sites, viewing areas, generator buildings, towers, storage buildings, sheds, Petroleum, Oil, and Lubricants (POLs), and service buildings for space exploration activities. Twenty of these facilities are located on KSC and two on Cape Canaveral Air Force Station. Enclosed are photos, descriptions, and a map of these facilities for your evaluation.

NASA has determined that these facilities and/or structures do not meet the criteria guidelines established within 36 CFR Part 60.4, National Register Criteria for Evaluation and are not significant contributing properties to any of our six historic districts. These properties are no longer needed at KSC in support of future programs.

If you have any questions, please contact me at (321) 867-8452 or Nancy English at (321) 867-6987.

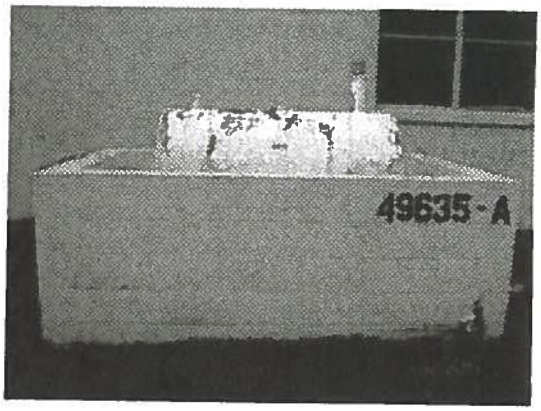
Barbara A. Naylor
Barbara A. Naylor
KSC Historic Preservation Officer

2 Enclosures:
1. Photo/Description of Facilities
2. Facilities Location Maps

cc:
ACHP/Tom McCulloch
HQS FPO/Jennifer Groman
KSC/CC/Tracy Belford
KSC/TA-B4C/Sheryl Chaffee
KSC/AA-D/Trey Carlson
KSC/TA-B/K. Gorman
KSC/B3A/S. Miller
KSC/B3C/C. Moeller

KSC Real Properties Slated for FY 2012 Demolition – Additional Facilities added to Design Package One

49635 – Environmental Health/Health Physics Facility - Built in 1965 – Function: Environmental Health Building – Facility use for medical care: hospitals, infirmaries, dispensaries & health units. Located on CCAFS.

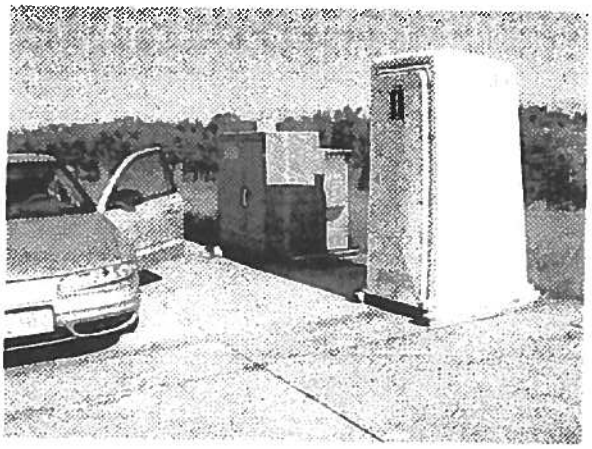


49635A – Tank Diesel Fuel – Built in 1995 – Tank, diesel. Located on CCAFS.

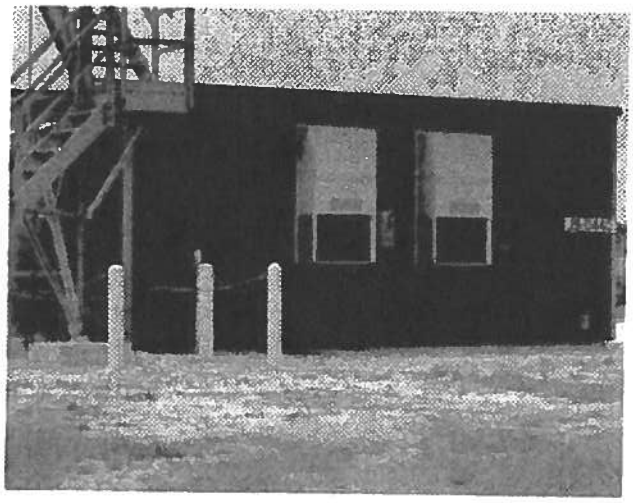
H5-1113 – North Papi Lights (7500 feet) – Built in 1981 – Airfield Pavement Lighting - Lighting directly related to aviation operations.

Enclosure #1

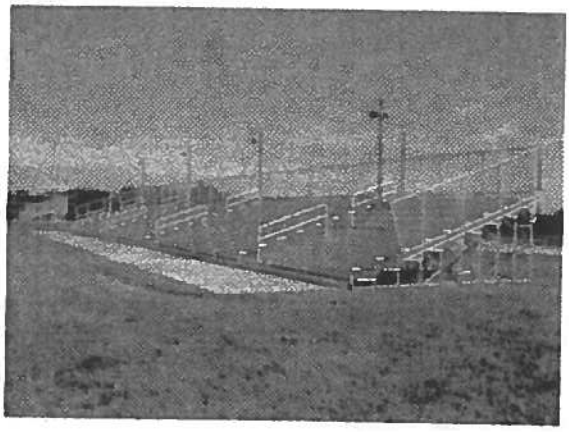
H5-1315 – North Papi Lights (6500 feet) – Built in 1981 – Airfield Pavement Lighting – Lighting directly related to aviation operations.



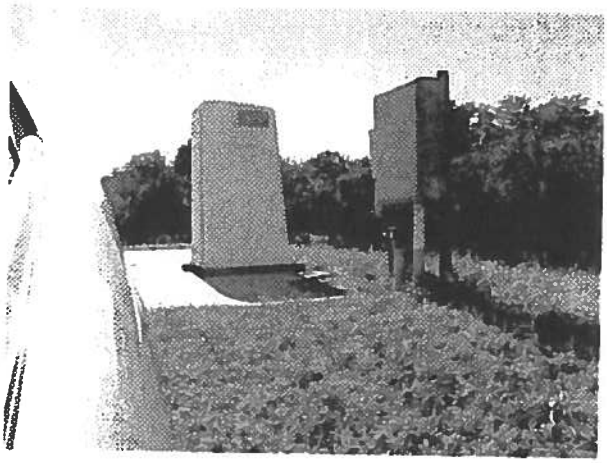
J5-386 – Built in 1993 – SLF Optical Tracker Site A – Built in 1993 - Camera Pads & Structures - Structure designed to have cameras installed for recording launch vehicles in flight.



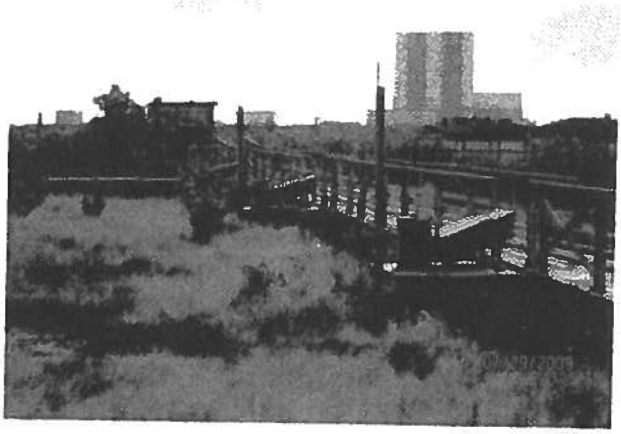
J5-0440 – TACAN Site - Built in 2001 – Facility that supports aircraft navigation and traffic control operations.



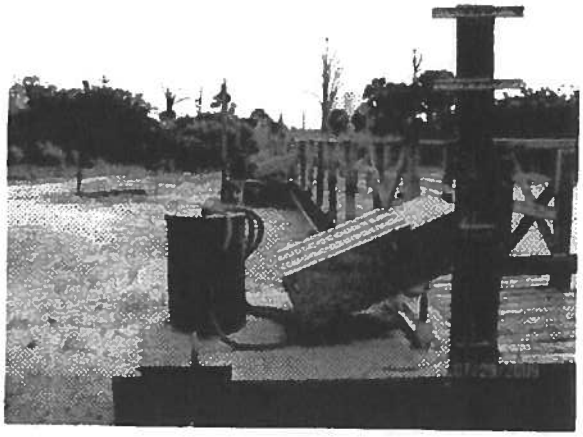
J5-1198 – Runway Viewing Area - Built in 1982 - Miscellaneous outdoor community facilities, bleachers.



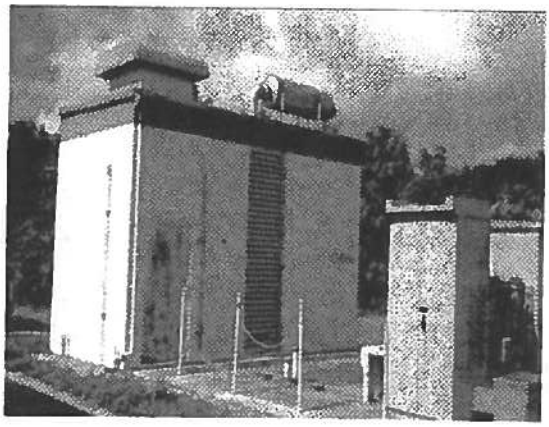
J5-2098 – SLF Optical Tracker Site D - Built in 1993 - Camera Pads & Structures - Structure designed to have cameras installed for recording launch vehicles in flight.



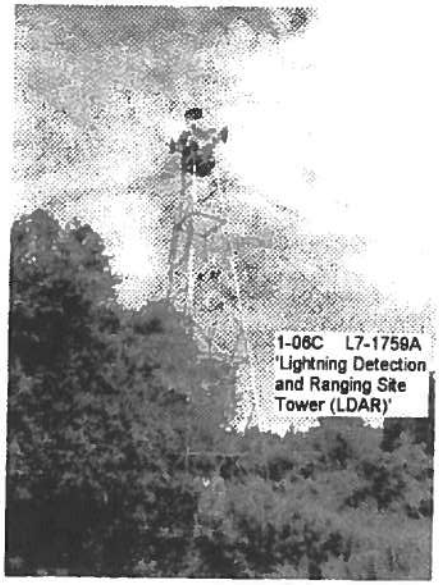
K6-1170 – South Papi Lights (6500 feet) - Built in 1982 – Airfield Payment Lighting - Lighting directly related to aviation operations.



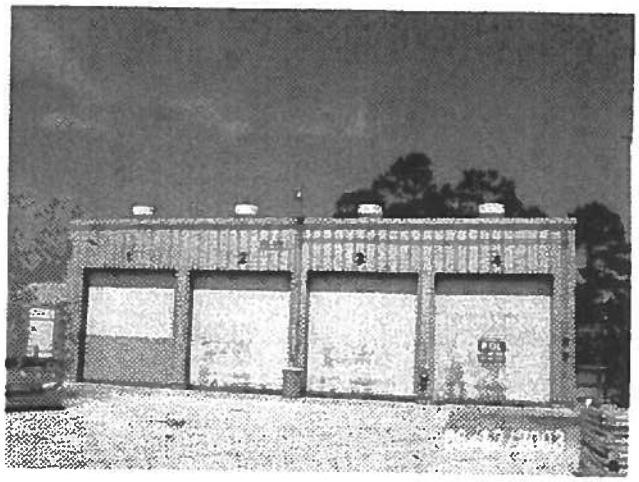
K6-1323 – South Papi Lights (7500 feet) - Built in 1982 - Airfield Payment Lighting - Lighting directly related to aviation operations.



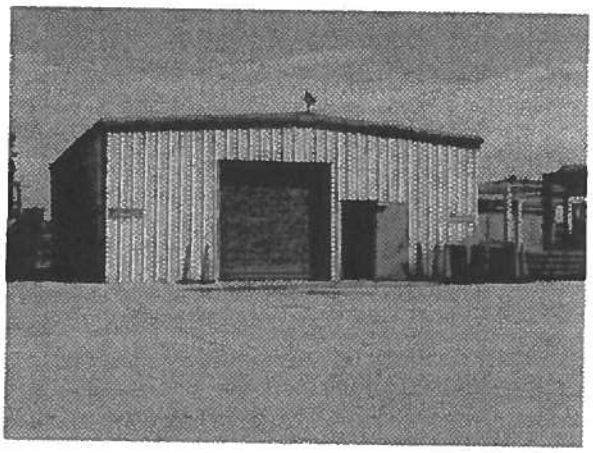
K7-1557A – Generator Building - Built in 1965 – Service Building - Launch complex building housing equipment; mothballed in 1995.



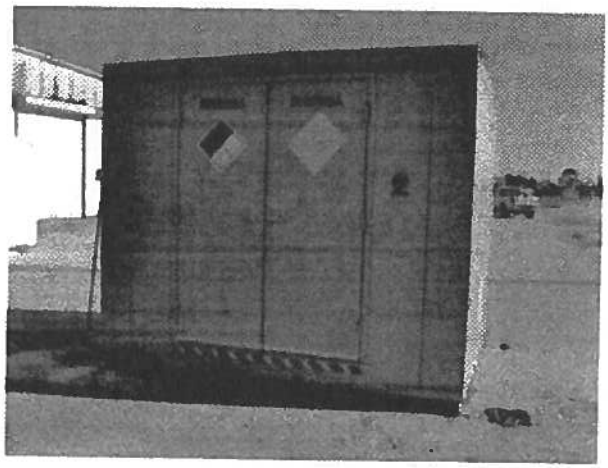
L7-1759A – Lightning Detection and Ranging Site Tower (LDAR) – Built in 1990 – Tracking Station used in data acquisition and tracking of manned & unmanned spacecraft & satellites.



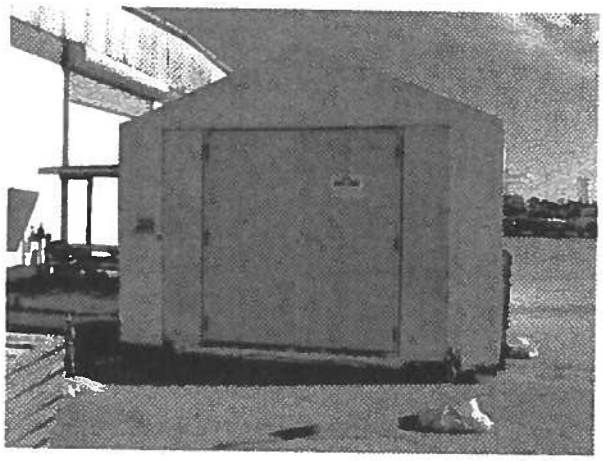
M6-486I – Storage Building – Built in 1997 - Covered Storage - Facility used for covered storage of supplies.



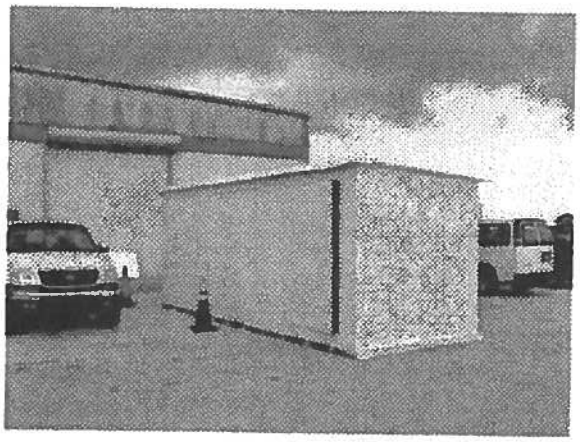
M6-486J – Storage Building – Built in 1967 – Covered Storage – Facility used for covered storage of supplies.



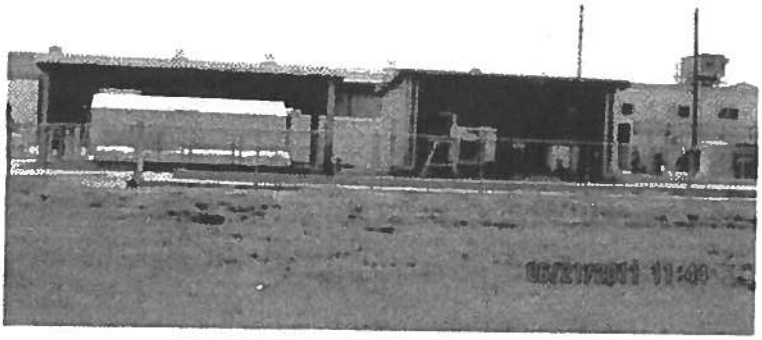
M6-486K – POL – Built in 2006 - Flammables Storehouse – Facility used for inflammable and combustible material (includes paints, POL products, oils, etc.).



M6-486L – Storage Building - Built in 2006 - Covered Storage – Facility used for covered storage of supplies.

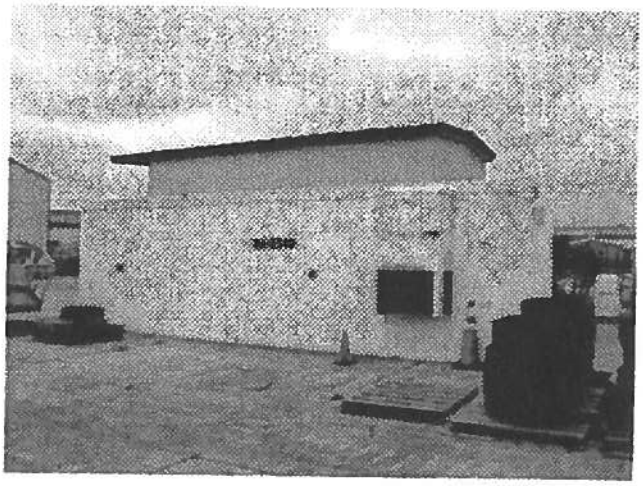


M6-486N – CMT Roof Crew Storage Shed - Built in 2007 - General Warehouse - Storage facility used for equipment and supplies that are continuously withdrawn and replenished.

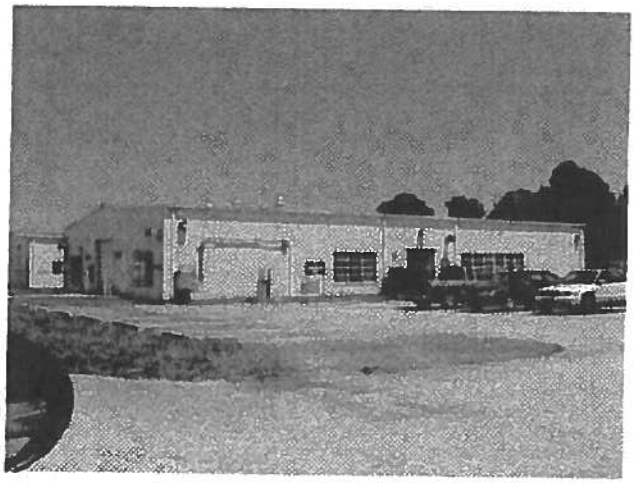


M6-534 – Heavy Equipment Wash Facility - Built in 1996 - Maintenance Shop - A building operated for the maintenance and repair of buildings, roads, grounds and utility systems.

M6-0536A – POL – Built in 1996 - Flammables Storehouse- Facility used for storage of inflammable and combustible material (includes paints, POL products, oils, etc.).



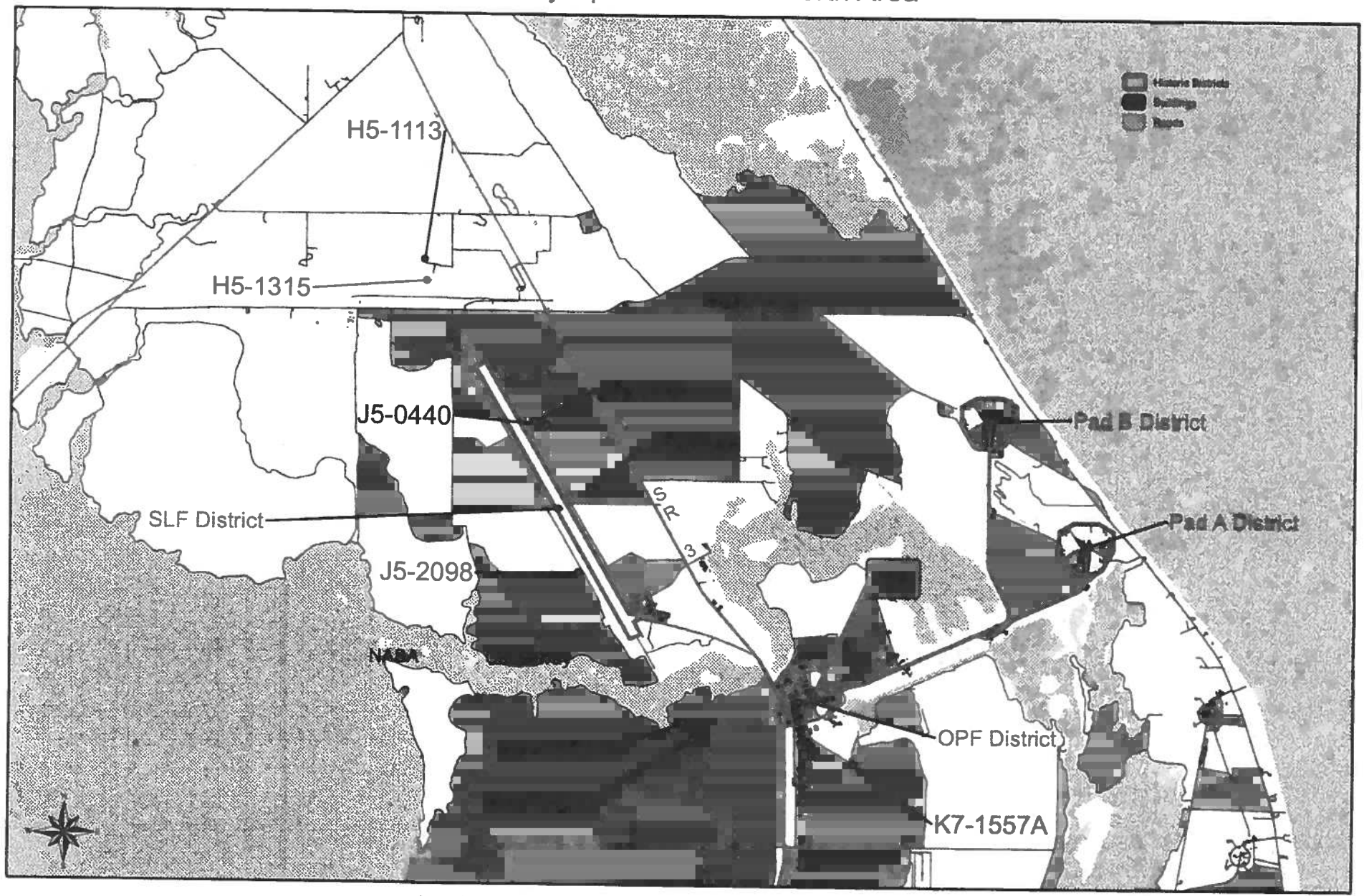
M6-540 – Storage Building – Built in 2005 - Facility used for covered storage of supplies.



M7-1521 – Operations Support Building – Built in 1982 – Function: Administrative Building, offices.

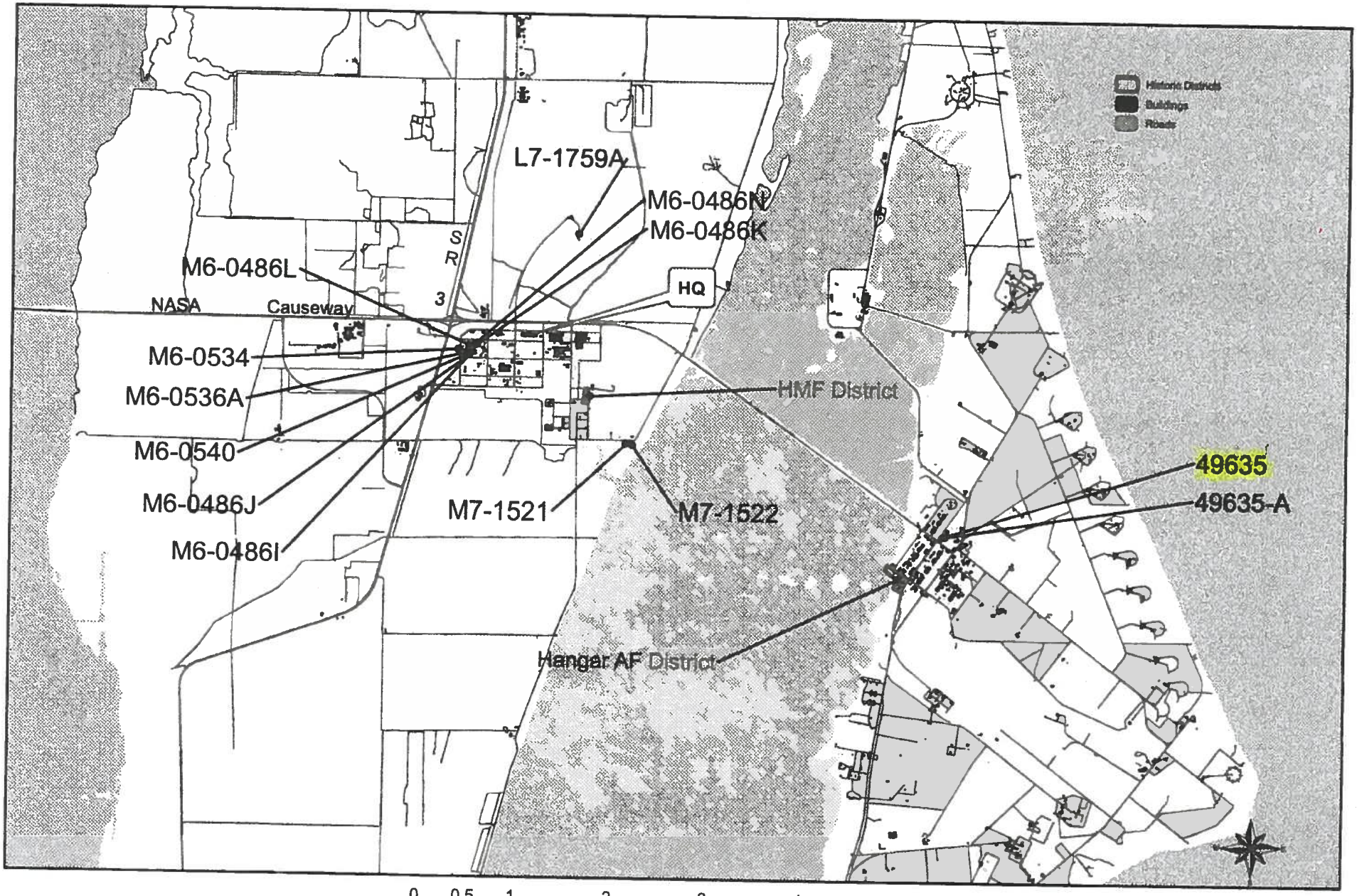
M7-1522 – Operations Support Building, Annex - Built in 1994 – Function: Administrative Building, offices.

Kennedy Space Center - North Area



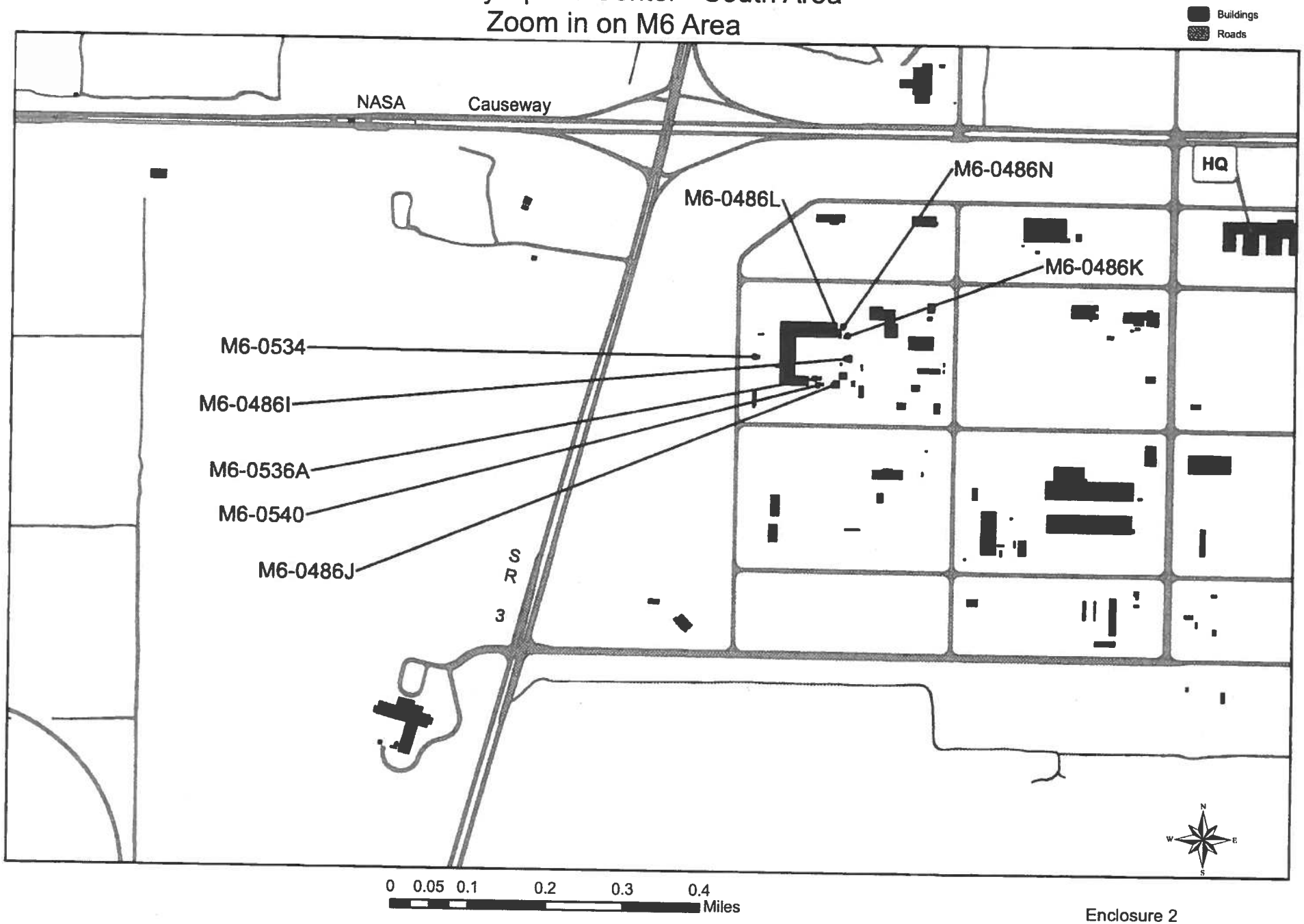
Enclosure 2

Kennedy Space Center - South Area



Enclosure 2

Kennedy Space Center - South Area
Zoom in on M6 Area



Enclosure 2

APPENDIX B: List of Acronyms

LIST OF ACRONYMS

ACI	Archaeological Consultants, Inc.
AFB	Air Force Base
ARB	Apollo Review Board
BOSU	Bioastronautics Operational Support Unit
CAIB	Columbia Accident Investigation Board
CCAFS	Cape Canaveral Air Force Station
DoD	Department of Defense
ET	External Tank
EVA	Extravehicular Activity
FMSF	Florida Master Site File
ICBM	Intercontinental Ballistic Missile
IHA	InoMedic Health Applications
IRBM	Intermediate Range Ballistic Missile
ISS	International Space Station
KSC	Kennedy Space Center
LC	Launch Complex
LRST	Launch Recovery Support Team
NACA	National Advisory Committee for Aeronautics
NASA	National Aeronautics and Space Administration
NRHP	National Register of Historic Places
SRB	Solid Rocket Booster
SSME	Space Shuttle Main Engine
SSP	Space Shuttle Program
STG	Space Task Group
STS	Space Transportation System
U.S.	United States
USAF	United States Air Force
USSC	United States Strategic Command
USSR	Union of Soviet Socialist Republics

APPENDIX C: FMSF Form

☒ Original
☐ Update

HISTORICAL STRUCTURE FORM
FLORIDA MASTER SITE FILE
Version 4.0 1/07

Site #8 BR02905
Field Date 2-15-2012
Form Date 2-22-2012
Recorder # _____

Shaded Fields represent the minimum acceptable level of documentation.
Consult the *Guide to Historical Structure Forms* for detailed instructions.

Site Name(s) (address if none) Bioastronautics Operational Support Unit — Multiple Listing (DHR only) _____
Survey Project Name Hist Surv/Eval of Facility 49635, CCAFS, Brevard — Survey # (DHR only) _____
National Register Category (please check one) ☒building ☐structure ☐district ☐site ☐object
Ownership: ☐private-profit ☐private-nonprofit ☐private-individual ☐private-nonspecific ☐city ☐county ☐state ☒federal ☐Native American ☐foreign ☐unknown

LOCATION & MAPPING

	Street Number	Direction	Street Name	Street Type	Suffix Direction
Address:	Bldg# 49635		CCAFS Industrial Area		

Cross Streets (nearest / between) East of NASA Parkway/Hangar Road intersection
USGS 7.5 Map Name CAPE CANAVERAL — USGS Date 1976 — Plat or Other Map _____
City / Town (within 3 miles) Cape Canaveral — In City Limits? ☐yes ☒no ☐unknown — County Brevard
Township 22S — Range 37E — Section 07 — ¼ section: ☐NW ☐SW ☒SE ☐NE — Irregular-name: _____
Tax Parcel # N/A — Landgrant _____
Subdivision Name _____ — Block _____ — Lot _____
UTM Coordinates: Zone ☐16 ☒17 — Easting 541150 — Northing 3151975
Other Coordinates: X: _____ Y: _____ — Coordinate System & Datum _____
Name of Public Tract (e.g., park) _____

HISTORY

Construction Year: 1965 ☒approximately ☐year listed or earlier ☐year listed or later
Original Use Hospital — From (year): 1965 — To (year): 1972
Current Use Scientific laboratory — From (year): 1972 — To (year): pres.
Other Use Health center — From (year): 1972 — To (year): 2003
Moves: ☐yes ☒no ☐unknown Date: _____ Original address _____
Alterations: ☒yes ☐no ☐unknown Date: _____ Nature see attached
Additions: ☒yes ☐no ☐unknown Date: _____ Nature see attached
Architect (last name first): Steward-Skinner Assoc, Miami — Builder (last name first): _____
Ownership History (especially original owner, dates, profession, etc.) National Aeronautics and Space Administration (1972-present); US Air Force (1965-1972)
Is the Resource Affected by a Local Preservation Ordinance? ☐yes ☒no ☐unknown Describe _____

DESCRIPTION

Style Masonry Vernacular — Exterior Plan Rectangular — Number of Stories 1
Exterior Fabric(s) 1. Concrete block 2. _____ 3. _____
Roof Type(s) 1. Gable 2. _____ 3. _____
Roof Material(s) 1. Built-up 2. _____ 3. _____
Roof secondary strucs. (dormers etc.) 1. _____ 2. _____
Windows (types, materials, etc.) 2/2 DHS, aluminum, independent and paired;

Distinguishing Architectural Features (exterior or interior ornaments) exposed aggregate face block surrounding main entrance; projecting concrete window sills

Ancillary Features / Outbuildings (record outbuildings, major landscape features; use continuation sheet if needed.) tree-lined driveway along west (main) elevation (trees added ca. 1997); rear parking lot; three helipads to east

DHR USE ONLY	OFFICIAL EVALUATION	DHR USE ONLY
NR List Date _____ ☐Owner Objection	SHPO – Appears to meet criteria for NR listing: ☐yes ☐no ☐insufficient info Date _____ Init._____ KEEPER – Determined eligible: ☐yes ☐no Date _____ NR Criteria for Evaluation: ☐a ☐b ☐c ☐d (see *National Register Bulletin 15*, p. 2)	

HISTORICAL STRUCTURE FORM

Site # 8 BR02905

DESCRIPTION (continued)

Chimney: No.____ Chimney Material(s): 1. _____ 2. _____
Structural System(s): 1. Concrete block 2. _____ 3. _____
Foundation Type(s): 1. Slab 2. _____
Foundation Material(s): 1. Poured Concrete Footing 2. _____
Main Entrance (stylistic details) double 1-light metal swing door with glass sidelights and transom, west elevation

Porch Descriptions (types, locations, roof types, etc.) inset; west elevation at main entrance

Condition (overall resource condition): ☐excellent ☒good ☐fair ☐deteriorated ☐ruinous
Narrative Description of Resource see attached

Archaeological Remains _____ ☐Check if Archaeological Form Completed

RESEARCH METHODS (check all that apply)

☒FMSF record search (sites/surveys)	☒library research	☐building permits	☐Sanborn maps
☐FL State Archives/photo collection	☐city directory	☒occupant/owner interview	☐plat maps
☐property appraiser / tax records	☒newspaper files	☐neighbor interview	☐Public Lands Survey (DEP)
☒cultural resource survey (CRAS)	☒historic photos	☒interior inspection	☐HABS/HAER record search

☐other methods (describe) _____
Bibliographic References (give FMSF manuscript # if relevant, use continuation sheet if needed) see attached

OPINION OF RESOURCE SIGNIFICANCE

Appears to meet the criteria for National Register listing individually? ☒yes ☐no ☐insufficient information
Appears to meet the criteria for National Register listing as part of a district? ☐yes ☐no ☒insufficient information
Explanation of Evaluation (**required**, whether significant or not; use separate sheet if needed) see attached

Area(s) of Historical Significance (see *National Register Bulletin 15*, p. 8 for categories: e.g. "architecture", "ethnic heritage", "community planning & development", etc.)
1. Other 3. _____ 5. _____
2. _____ 4. _____ 6. _____

DOCUMENTATION

Accessible Documentation Not Filed with the Site File - including field notes, analysis notes, photos, plans and other important documents

1) Document type All materials at one location — Maintaining organization Archaeological Consultants Inc
Document description _____ — File or accession #'s P9026S

2) Document type _____ — Maintaining organization _____
Document description _____ — File or accession #'s _____

RECORDER INFORMATION

Recorder Name Slovinac, Trish — Affiliation Archaeological Consultants Inc
Recorder Contact Information 8110 Blaikie Court, St A, Sarasota, FL 34240/941-379-6206/ACIFloridaAcomcast.net
(address / phone / fax / e-mail)

Required Attachments

❶ **USGS 7.5' MAP WITH STRUCTURE LOCATION PINPOINTED IN RED**
❷ **LARGE SCALE STREET, PLAT OR PARCEL MAP** (available from most property appraiser web sites)
❸ **PHOTO OF MAIN FACADE, ARCHIVAL B&W PRINT OR DIGITAL IMAGE FILE**
If submitting an image file, it must be included on disk or CD AND in hard copy format (plain paper is acceptable).
Digital image must be at least 1600 x 1200 pixels, 24-bit color, jpeg or tiff.

CONTINUATION SHEET

Physical Description

The Bioastronautics Operational Support Unit (BOSU) is a one-story, Masonry Vernacular style building with approximate overall dimensions of 324 feet (ft) in length (north-south), 60 ft in width (east-west), and 13 ft in height (Photo 9). The entirety sits on a reinforced poured concrete slab foundation, supported by reinforced poured concrete piers and footers. The walls are comprised of concrete block, and topped with a slightly gabled roof that rests on steel joists. The main entrance is on the west elevation, just north of center, and is comprised of one set of double glass doors, with glass sidelights and transoms, inset 4 ft. The wall surface surrounding the door is faced with exposed aggregate facing block, as is 10 ft of the main wall on either side. Windows include individual and paired, two-over-two metal double hung sash.

Internally, the room arrangement is based on a double-loaded corridor plan, and is divisible into north and south areas. As originally constructed, the medical examination rooms and surgical rooms were located at the north end of the facility. Specific rooms were designated for major surgery; evaluation, treatment, and minor surgery; radiology; recovery and intensive care; audio, EKG, and eye examinations; and physician offices (Steward-Skinner Associates 1965). The south area of the facility originally had support areas for the BOSU team. Specific areas included a conference room/reference library, a medical communications center, a supply room, a bioinstrumentation lab, offices for medical personnel, and research laboratories. Also in the south end of the facility was a computer room for the meteorology group and offices for meteorological personnel (Steward-Skinner Associates 1965; Fields 2012). These areas generally had gypsum board or exposed concrete block walls, tile floors, and gypsum board ceilings.

Explanation of Evaluation

The BOSU is considered individually eligible for listing in the NRHP under Criterion A, in the area of Space Exploration. This facility demonstrates the role the USAF played in the U.S. Manned Space Program. Its period of significance is considered to be from 1964, when it was designed, through 1972, when the building was transferred to NASA for use as an occupational health clinic.

The BOSU was constructed by the U.S. Air Force (USAF) between 1964 and 1965 to house the Launch Site Recovery Command Post for the Launch Site Recovery Team, as well as a completely equipped surgical suite. The Launch Site Recovery Team was a group of military personnel, specially trained to rescue astronauts in the event of an emergency during the launch sequence. The team would carry the astronauts from the launch pad to Facility 49365, where doctors were capable of providing medical treatment to the astronauts within the surgical suite. Although no emergencies ever occurred during a manned spaceflight launch, Facility 49365 housed a vital service to the U.S. Manned Space Program. In addition, it served as the location where the Apollo 1 astronauts were first taken following the fire within their capsule during a simulation at Launch Complex 34.

The facility derives its primary significance from the surgical suite, located at the north end of the building. This area of the BOSU retains its original layout, and many of these spaces still have their original tile walls and floors. In addition, many of the rooms retain original furnishings, such as built-in stainless steel cabinetry, X-ray viewers and storage shelves, oxygen connections, and curtain lines. With regard to the south end of the facility, while most of the walls and ceilings remain intact, the floors have been changed to carpet or modern tile. In addition, some of the rooms in this part of the building, such as the conference room and computer room, have been altered from their original layout, and much of the original furniture has been replaced with modern furniture. Overall, the BOSU does retain a great deal of integrity of location, design, setting, materials, workmanship, feeling, and association.

CONTINUATION SHEET

Bibliography

Ebony
1966 "Angel of Mercy to the Astronauts." June:48-54.

Hall, Carlton
2012 Personal communication with Patricia Slovinac, February 15.

NASA, Kennedy Space Center
1967 "AS 204 Release #3." January 27. On file, KSC Archives, Box 37A.1, Folder 14.
2012 Real property record, Building 49365. On file, Real Property Office.

Nickell, Rodney
2012 Personal communication with Patricia Slovinac, February 15.

Steward-Skinner Associates
1964 "Bioastronautics-Operational Support Unit." January. On file, KSC Archives Department.
1965 "As Built Drawings: Bioastronautics-Operational Support Unit." July. On file, KSC Engineering Documentation Center.

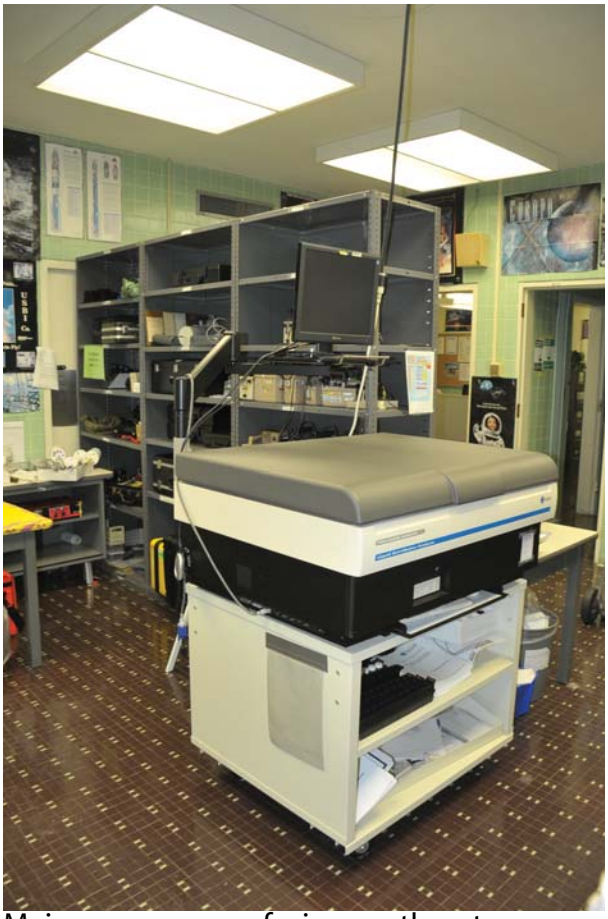
HISTORICAL STRUCTURE FORM Site # 8BR2905

PHOTOGRAPHS

West elevation, facing east

Main entrance, facing northeast

PHOTOGRAPHS



Major surgery area, facing southeast

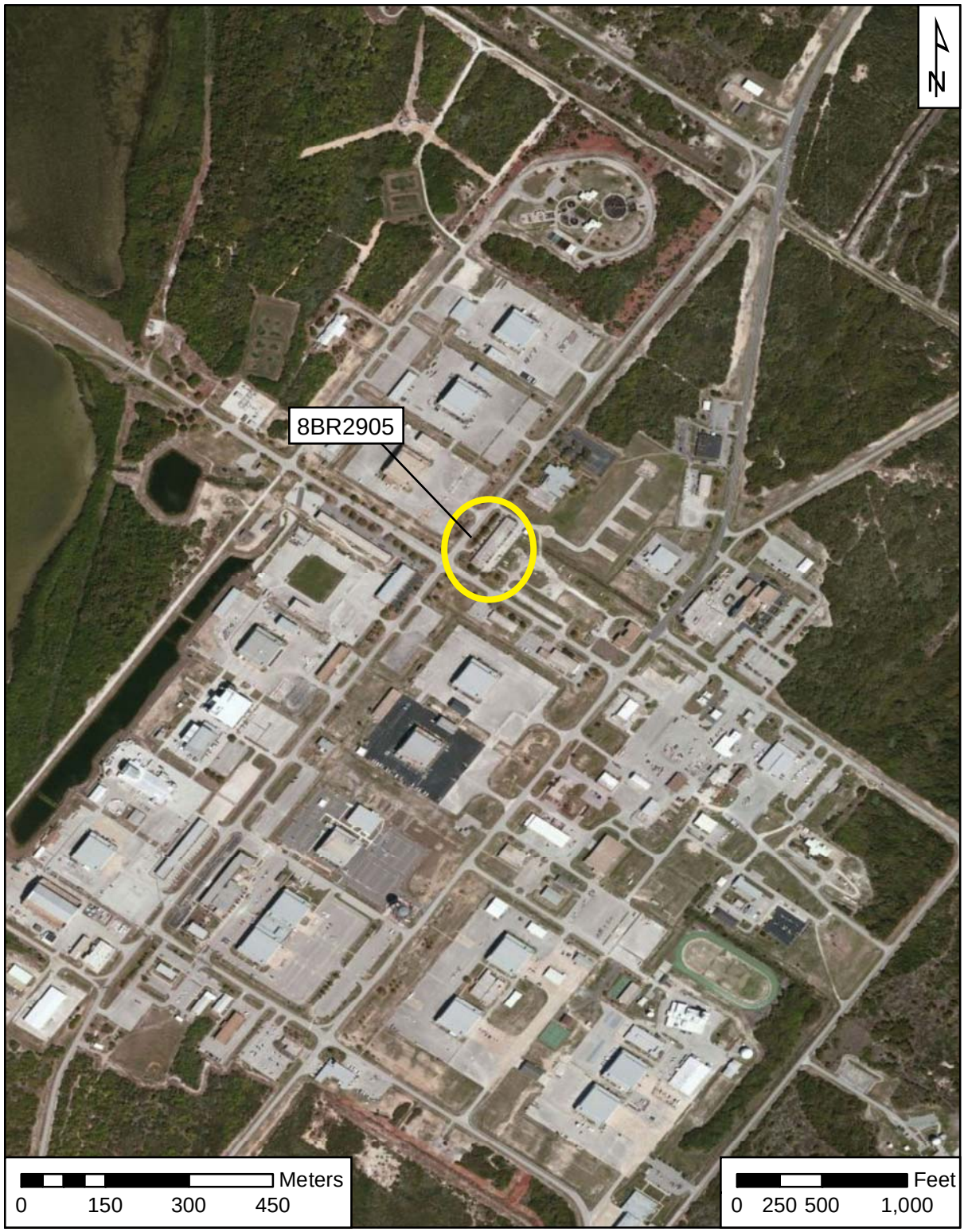
Intensive care area, facing northwest

Minor surgery area, facing southwest

Hallway in surgical area, facing northwest

HISTORIC STRUCTURE FORM Site # 8BR2905

PHOTOGRAPHS



Microsoft 2010 - *Bing Maps*

Historic Structure Form

Site # **8BR2905**

USGS MAP

Cape Canaveral

Township 22 South, Range 37 East, Section 7

National Geographic Society (2011) *USA Topo Maps.*

ARCHAEOLOGICAL CONSULTANTS, INC.

APPENDIX D: Survey Log

Ent D (FMSF only)___/___/___

Survey Log Sheet

Florida Master Site File
Version 4.1 1/07

Survey # (FMSF only) _____

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (name and project phase) Historical Survey and Evaluation of the BOSU

Report Title (exactly as on title page) Historical Survey and Evaluation of the Facility 49635/Environmental Health/Health Physics Facility (BOSU), Cape Canaveral Air Force Station, Brevard County, Florida

Report Author(s) (as on title page– individual or corporate; last names first) Trish Slovinac, Archaeological Consultants, Inc. (ACI)

Publication Date (year) 2012 **Total Number of Pages in Report** (count text, figures, tables, not site forms) 34

Publication Information (Give series and no. in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)
Archaeological Consultants, Inc., P.O. Box 5103, Sarasota, FL 34277-5103

Supervisor(s) of Fieldwork (whether or not the same as author[s]; last name first) Joan Deming

Affiliation of Fieldworkers (organization, city) ACI

Key Words/Phrases (Don't use the county, or common words like *archaeology*, *structure*, *survey*, *architecture*. Limit each word or phrase to 25 characters.) Cape Canaveral Air Force Station, Bioastronautics Operational Support Unit, Facility 49635, Dispensary

Survey Sponsors (corporation, government unit, or person who is directly paying for fieldwork)
Name NASA-John F. Kennedy Space Center
Address/Phone _____

Recorder of *Log Sheet* Trish Slovinac **Date *Log Sheet* Completed** 5 /18 /12

Is this survey or project a continuation of a previous project? ☑ No ❑ Yes: **Previous survey #(s) (FMSF only)** _____

Mapping

Counties (List each one in which field survey was done - do not abbreviate; use supplement sheet if necessary) Brevard

USGS 1:24,000 Map(s) : Map Name/Date of Latest Revision (use supplement sheet if necessary): Cape Canaveral, Fla. 1976

Description of Survey Area

Dates for Fieldwork: Start 02/15/12 End 02/16/12 **Total Area Surveyed** (fill in one) _____ hectares _____ acres
Number of Distinct Tracts or Areas Surveyed 1
If Corridor (fill in one for each): **Width** _____ meters _____ feet **Length** _____ kilometers _____ miles

Survey Log Sheet

Survey #_____

Research and Field Methods

Types of Survey (check all that apply): ❑ archaeological ☑ architectural ☑ historical/archival ❑ underwater ❑ other:_____

Preliminary Methods (✓Check as many as apply to the project as a whole.)

❑ Florida Archives (Gray Building)	☑ library research- *local public*	❑ local property or tax records	☑ other historic maps
❑ Florida Photo Archives (Gray Building)	☑ library-special collection - *nonlocal*	☑ newspaper files	❑ soils maps or data
☑ Site File property search	❑ Public Lands Survey (maps at DEP)	☑ literature search	❑ windshield survey
☑ Site File survey search	☑ local informant(s)	❑ Sanborn Insurance maps	❑ aerial photography

☑ other (describe) NASA archives at KSC; as-built drawings at KSC

Archaeological Methods (✓Check as many as apply to the project as a whole.)

☑ Check here if **NO** archaeological methods were used.

❑ surface collection, controlled	❑ other screen shovel test (size: ____)	❑ block excavation (at least 2x2 M)
❑ surface collection, **un**controlled	❑ water screen (finest size: ____)	❑ soil resistivity
❑ shovel test-1/4"screen	❑ posthole tests	❑ magnetometer
❑ shovel test-1/8" screen	❑ auger (size:____)	❑ side scan sonar
❑ shovel test 1/16"screen	❑ coring	❑ unknown
❑ shovel test-unscreened	❑ test excavation (at least 1x2 M)	

❑ other (describe): _____

Historical/Architectural Methods (✓Check as many as apply to the project as a whole.)

❑ Check here if **NO** historical/architectural methods were used.

❑ building permits	❑ demolition permits	❑ neighbor interview	❑ subdivision maps
❑ commercial permits	☑ exposed ground inspected	☑ occupant interview	❑ tax records
☑ interior documentation	☑ local property records	❑ occupation permits	❑ unknown

☑ other (describe): NASA real property records, as-built drawings, historical photos

Scope/Intensity/Procedures Archival research, informant interviews, historical/architectural field survey; preparation of FMSF form; report preparation

Survey Results (cultural resources recorded)

Site Significance Evaluated? ☑ Yes ❑ No If *Yes*, circle NR-eligible/significant site numbers below.

Site Counts: Previously Recorded Sites 0 **Newly Recorded Sites** 1

Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8." Attach supplementary pages if necessary) _____

Newly Recorded Site #'s (Are you sure all are originals and not updates? Identify methods used to check for updates, i.e., researched Site File records. List site #'s without "8." Attach supplementary pages if necessary.) BR2905

Site Form Used: ☑ Site File Paper Form ❑ SmartForm II Electronic Recording Form

REQUIRED: ATTACH PLOT OF SURVEY AREA ON PHOTOCOPIES OF USGS 1:24,000 MAP(S)

DO NOT USE SITE FILE USE ONLY DO NOT USE

BAR Related

❑ 872 ❑ 1A32 #_____

❑ CARL ❑ UW

BHP Related

❑ State Historic Preservation Grant

❑ Compliance Review: CRAT #_____

HR6E066R0107 Florida Master Site File, Division of Historical Resources, Gray Building, 500 South Bronough Street, Tallahassee, Florida 32399-0250

Phone 850-245-6440, FAX 850-245-6439, Email: SiteFile@dos.state.fl.us

Location of Facility #49635/Environmental Health/Health Physics Facility (BOSU) in the Industrial Area of CCAFS;
Township 22 South, Range 37 East, Section 7;
USGS Cape Canaveral.
(National Geographic Society 2011).