

History Survey and Evaluation, Hypergol Module Processing South (M7-1212) and Boresight Control Building (M7-0867)

John F. Kennedy Space Center, Brevard County, Florida



New South Associates, Inc.

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and Boresight Control Building (M7-0867)**

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Report submitted to:

InoMedic Health Applications, LLC • John F. Kennedy Space Center •
Kennedy Space Center, Florida 32899

Report prepared by:

New South Associates • 6150 East Ponce de Leon Avenue • Stone Mountain, Georgia 30083



Mary Beth Reed – Principal Investigator

David Price – Historian and Author

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ABSTRACT

New South Associates, Inc., under contract with InoMedic Health Applications, LLC conducted background research and a historic building survey of two buildings in the John F. Kennedy Space Center (KSC) Industrial Area, including the Hypergol Module Processing South (HMP South) (M7-1212) and the Boresight Control Building (M7-0867). The Florida Master Site File has assigned the following numbers: 8BR2933 for HMP South and 8BR2934 for the Boresight Control Building. The survey considered whether the two facilities are eligible as elements of the National Register of Historic Places (NRHP)-eligible Hypergol Maintenance and Checkout Area (HMCA) Historic District. The buildings were also evaluated for individual listing in the NRHP. HMP South is recommended as individually eligible for inclusion in the NRHP-eligible HMCA Historic District in the context of the U.S. Space Shuttle Program (1969-2011) under NRHP Criterion A in the area of Space Exploration. Since it has achieved significance within the past 50 years, Criteria Consideration G applies. It is also recommended eligible for individual listing in the NRHP.

The Boresight Control Building is recommended not eligible for individual listing or as a contributing resource to the HMCA Historic District. The facility was evaluated under NRHP Criteria A, B, and C in the context of the U.S. Space Shuttle Program (1969-2011) in the area of Space Exploration. It was also evaluated under its earlier historic context of the Gemini/Apollo programs of the 1960s.

ACKNOWLEDGEMENTS

A number of individuals at KSC contributed time, knowledge, and other resources to help complete this report. Barbara A. Naylor, KSC Historic Preservation Officer, coordinated the survey project and assisted with site tours and background information. Nancy S. English, KSC Cultural Resources Management, also assisted with site tours and background information. Elaine Liston, Senior Librarian/Archivist at KSC Library Archives, conducted background research and historical documentation for the report. Larry E. Taylor, Facility Manager, and Stanley D. Johnson, Senior Systems Technician, provided tours of the surveyed resources and background information. Douglas A. Younger, KSC Environmental Protection Specialist, supplied background information on the history and use of the Boresight Control Building. Sue Tzareff, the RCRA Contamination Assessment Program Manager, Environmental Sampling, Analysis & Monitoring (ESAM) Section of the Environmental Services Branch, InoMedic Health Applications (IHA), and Wayne Sarosi, former Facility Manager at the Boresight Control Building, provided valuable information on the building's use and renovations during his tenures there from 1996 through 1998, and again from 2003 through 2011.

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I. INTRODUCTION

New South Associates, Inc., under contract with InoMedic Health Applications, LLC conducted background research and a historic building survey of two buildings in the John F. Kennedy Space Center (KSC) Industrial Area, including the Hypergol Module Processing South (HMP South) (M7-1212) and the Boresight Control Building (M7-0867) (Figure 1). HMP South was originally built in 1964 to test, fuel, service, and checkout the Apollo spacecraft hypergolic propulsion systems. The building's interior was renovated in 1976 to test and process the Space Shuttle's forward Reaction Control System (RCS). The forward RCS was located in the shuttle's nose area to provide thrust for pitch, yaw, and roll rotational maneuvers while in orbit, as well as small velocity changes (National Aeronautics and Space Administration [NASA] 1988). The Boresight Control Building was built in 1963 as part of the Radar Boresight Range, which tested antenna systems used on the Gemini spacecraft and Agena target vehicle. It was renovated in the late 1980s to test antenna and radar systems used on the Space Shuttle.

KSC is located on the northern portion of Merritt Island, between the Indian and Banana Rivers in Brevard County, Florida. The historic survey evaluated whether HMP South and the Boresight Control Building are eligible as elements of the National Register of Historic Places (NRHP)-eligible Hypergol Maintenance and Checkout Area (HMCA) Historic District. The buildings were also evaluated for individual listing in the NRHP. The survey included background research, field inspection, digital photography, interviews of current and former KSC employees, and preparation of Florida Master Site File (FMSF) and Survey Log forms (Appendix A and B).

NASA and Archaeological Consultants, Inc. of Sarasota, Florida, conducted the Space Shuttle Program (SSP) Historic Survey in 2006-07, and documented the HMCA Historic District in 2007. A draft NRHP nomination was prepared for the district, although it has not been officially submitted. The proposed district contains two contributing resources, including the Hypergol Module Processing North (HMP North) and the Hypergol Support Building (HSB). HMP North was also determined individually eligible for listing in the NRHP under Criterion A in the area of Space Exploration as a one-of-a-kind facility that was critical to the successive launches of the SSP. The district also contains one non-contributing resource, the Ground Service Equipment (GSE) Support Building. The district's original boundaries were defined as a rectangular area that begins at the southwest corner of Fifth Street S.E. and G Avenue S.E., and

Figure 1.
Location of Surveyed Buildings, Kennedy Space Center, Industrial Area



Source: USGS Orisino, Florida Quadrangle, 1976

extends approximately 300 feet to the west and 830 feet to the south (Figure 7). HMP North and the HSB were built in 1964 to support NASA's Apollo program and were later renovated in 1976 to support the SSP (Deming and Slovinac 2007).

HMP South (8BR2933) was built in 1964 at the same time as the other eligible buildings in the HMCA district and features a similar architectural design, construction materials, and history of use for the space industry. However, it was not documented in the SSP Historic Survey due to ongoing usage requirements at the time. The Boresight Control Building (8BR2934) has not been previously surveyed or evaluated for individual listing in the NRHP or as part of the HMCA Historic District.

The remainder of this report is organized as follows. Chapter II provides an overview history of NASA and the SSP. Chapter III presents building descriptions of the surveyed properties. Chapter IV includes the historic background and NRHP eligibility evaluation of the surveyed properties. Chapter V presents the survey results and recommendations. Following a list of References Cited, Appendix A contains the Survey Log Sheet and Appendix B contains the Florida Master Site File forms for the surveyed properties.

II. HISTORIC CONTEXT

NASA AND THE SPACE SHUTTLE PROGRAM

NASA was created in 1958 in response to the Soviet launch of the *Sputnik* satellite a year earlier. NASA's first series of missions were to send man into space, followed by manned orbits around the Earth, mastery of rendezvous and docking procedures, and finally, landing man on the moon. These goals defined the three main programs of the late 1950s and 1960s: Mercury, Gemini, and Apollo. This effort culminated in the first moon landing, which occurred on July 20, 1969. Moon landings continued until 1972 when the Apollo program ended. Programs after Apollo included the Skylab space station that orbited Earth from 1973 to 1979, and the Apollo-Soyuz Test Project, the first space mission undertaken as a joint effort between the United States and the Soviet Union in 1975. By the mid-1970s, it was clear that NASA's next major program would be based on a reusable space shuttle, designed to serve orbiting space stations and related missions (Deming and Slovinac 2008:2.1; NASA 2010; NASA 2009).

President Nixon established the Space Task Group in 1969 to determine the future course of the U.S. Space Program. This led to the creation of the SSP, which was announced in a speech by President Richard Nixon in 1972. In the speech, Nixon outlined the future of the SSP based on the idea that a series of reusable space flight vehicles would provide "routine access to space" (Deming and Slovinac 2008:2.1). Following this announcement, new SSP contracts were awarded, new space vehicles were designed, old Apollo-era facilities were retro-fitted, and new facilities were built. After a decade of preparation, the first shuttle flight occurred in 1981. After almost three decades of operations, the SSP was retired in 2011.

During those twenty-nine years of operation, there were over 130 different flights, using a total of five space shuttles: *Columbia*, *Challenger*, *Discovery*, *Atlantis*, and *Endeavour* (the prototype, *Enterprise*, never went into space). The SSP achieved a number of significant goals. In addition to supporting diverse space facilities such as Spacelab, the Hubble Space Telescope, the *Mir* Space Station, and the International Space Station (ISS), the shuttles contributed to many other space programs. Among these were various satellite systems (from the COMSAT, Communication Satellite to the Advanced Communications Technology Satellite, or ACTS), and the unmanned probes that were sent to Jupiter (*Galileo*), Venus (*Magellan*), and the Sun (*Ulysses*). Additionally, the shuttle has deployed a number of Department of Defense (DoD) payloads that remain classified (Deming and Slovinac 2008:2.22-24).

Two significant accidents have been associated with the SSP. The *Challenger* (1/28/86) and *Columbia* (2/1/03) disasters resulted in the loss of all crew members on board (Deming and Slovinac 2008:2.15). Both incidents caused lengthy flight down time for the program, while exhaustive investigations led to extensive physical and procedural improvements.

Most of the Space Transportation System (STS) was in place by the time of the first shuttle launch. The basic STS components have not changed since reusable space shuttles were first designed in the 1970s; however, as with any endeavor that occurs over almost a thirty-year period, changes were made to the STS, its support structures, and its operational procedures based on mission shifts, the two accidents, and improvements in technology.

The final design for the Space Shuttle was chosen from twenty-nine different possibilities in 1972. After years of testing and preparation, the first shuttle vehicle, *Columbia*, arrived at Kennedy Space Center in 1979. Most of the work required to prepare the vehicle for launch was done in the Orbiter Processing Facility (OPF). After a series of test flights each with a crew of two (STS-2 through STS-4), the first operational flight, STS-5, occurred the following year, November 11, 1982 (Deming and Slovinac 2008:2.13-15).

These launches were conducted from Launch Complex 39, Pad A, on KSC. By the mid-1980s, Launch Complex 39, Pad B, was also available for launch services. Since the beginning, there were on average around five shuttle launches per year, with no launches for many months following each of the two major accidents (Deming and Slovinac 2008:6.4).

The end of the SSP came in July of 2011, when the crew of *Atlantis* landed at KSC to complete the program's 135th mission (STS-135). Since the SSP's first launch 1981, the program launched 355 astronauts from 16 countries. The five shuttles traveled more than 542 million miles and conducted over 2,000 experiments in the fields of Earth, astronomy, biological, and materials sciences. The shuttles docked with two space stations, including the Russian Mir and the International Space Station, and deployed 180 payloads such as satellites and spacecraft. With the return of the final mission, NASA Administrator Charles Bolden said, "the brave astronauts of STS-135 are emblematic of the shuttle program – skilled professionals from diverse backgrounds who propelled America to continued leadership in space with the shuttle's many successes" (Curie, Herring, and Thomas 2011).

III. BUILDING DESCRIPTIONS

SITE LOCATION

The survey area on the southeast corner of the KSC Industrial Area is generally referred to by two names, including the Hypergol Maintenance Facility (HMF) and the Fluid Test Area. The area is located between Fifth and Sixth Street S.E., along G Avenue S.E., and also includes the former Radar Boresight Range along Fifth Street S.E. (Figure 1). Prior to 1964, the survey area was undeveloped.

HMP SOUTH (M7-1212)

HMP South (8BR2933) is a concrete block building with a reinforced concrete foundation. The building has an irregular footprint that contains 7,100 square feet of floor area. It has two high-bay test cells, one on the east side and one on the west side, which measure approximately 40x40x60 feet. Each cell features two vertical-lift exterior doors that measure 22x40 feet and are equipped with inflatable seals for excluding contaminants. Each test cell has a 10-ton overhead bridge crane with a hook height of 45 feet. Both cells have a large capacity exhaust system and a floor system that collects and dilutes hypergolic spills. Between the test cells is a two-story central area that contains a control room, equipment room, and storage area (NASA 1967:10-55) (Figure 2).

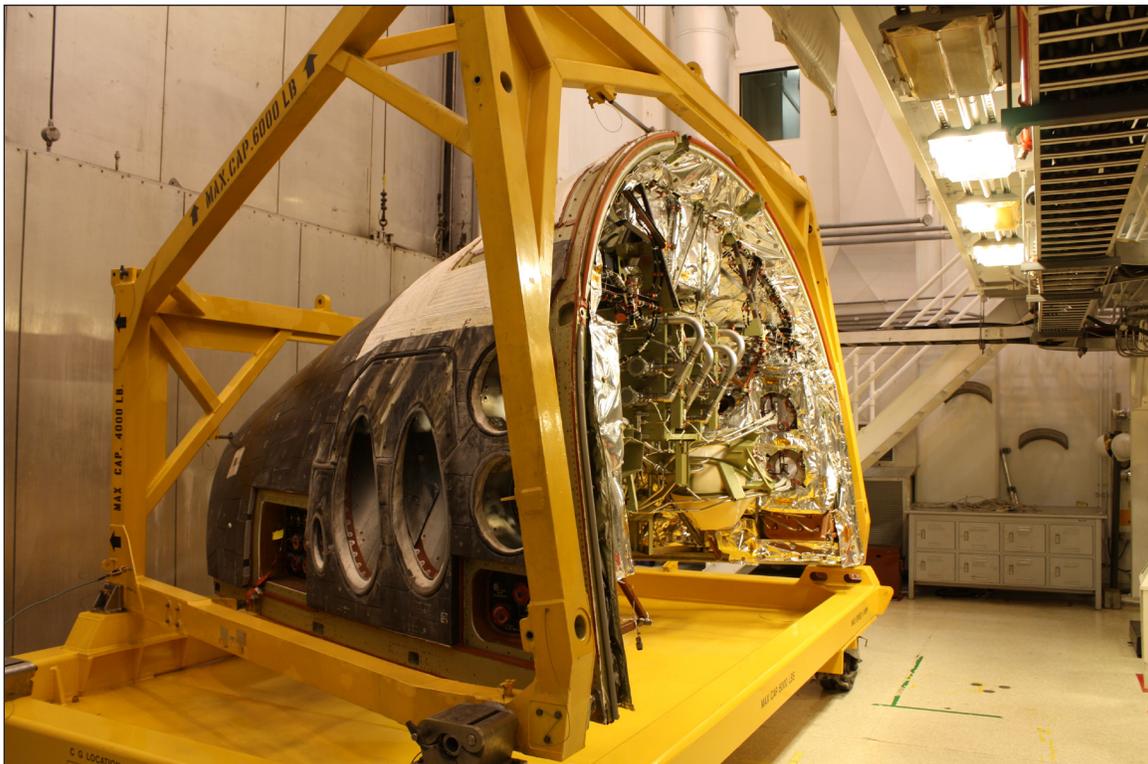
On the south side of HMP South's exterior are chilled water storage tanks and basins, compressed air tanks, gaseous nitrogen/helium tanks, washdown systems, and a contaminated effluent tank to control and contain inadvertent spilling of toxic and combustible propellants.

The interiors of HMP South's test cells contain hypergolic fuel and oxidizer servicing areas that are capable of testing and servicing the Space Shuttle's forward RCS. The east test cell contains three levels of work platforms arranged in a U-shape around the outer walls. This cell was used primarily as a staging area or auxiliary test space, with the west test cell reserved as the primary area for forward OMS module processing. The west test cell contains a two-level work area. The ground level has an OMS module staging area and all of the hypergolic fuel and oxidizer pumps, lines, and gauges. Above this ground level is a steel-frame upper level work platform. The overhead bridge crane lifted the OMS module up onto this platform where it was maneuvered into different positions depending on the work performed.

Figure 2.
Hypergol Module Processing South (M7-1212)



A. Exterior Oblique, View Southwest



B. Interior Test Cell with Forward RCS Module, View Northwest

The two-story central portion of HMP South contains a variety of rooms that support the test cell work areas, including a Thermal Control System (TCS) room, control room, Hardware Interface Module (HIM) room, equipment testing rooms, and central corridor. Interior spaces are typically finished with suspended acoustic tile ceilings, drywall walls, and tile floors.

BORESIGHT CONTROL BUILDING (M7-0867)

The Boresight Control Building (8BR2934) is located just northeast of the HMCA Historic District boundaries. The building is set at the east end of the former Radar Boresight Range, a cleared area surrounded by low trees and brushy wetlands. It is set at an angle so that the building's western corner faces the range.

It is a two-story building with a concrete block structure and reinforced concrete foundation. The block-shaped building measures 20x20x20 feet. There is a mechanical room on the first floor, a control room on the second floor, and a pedestal on the roof for mounting a test antenna. There is also a crane on the roof for lifting equipment from the ground surface (NASA 1974:10-67). There are two fixed single-light windows on the building's second story that face west toward the antenna range. Extending west is a railroad track, approximately 400 feet long, equipped with a movable radar test tower. This track and tower were installed circa 1986 when the building was refurbished for the Space Shuttle Program. Adjacent to the southwest elevation is a telephone pole (Figure 3).

The building is accessed via double pedestrian doors on the northeast elevation at the ground and/or second level. There is a single pedestrian door on the ground level of the southeast elevation. The northeast elevation also has a two-story steel staircase that leads to the second floor entrance and to the roof. The staircase is shielded on its north side by an approximately 5x20-foot wing wall. The perimeter of the roof is lined by a metal safety railing. The west end of the test antenna on the roof is shielded by blocks of radar absorbent foam padding in deteriorated condition. Similar absorbent foam padding is stacked in a column on the northwest elevation (Figure 3).

The most recent renovation of the building occurred in 2006. Repairs were made to the roof and the exterior and control room walls were also painted. Other repairs completed were installation of new windows, a new roof crane, new radar absorbent padding, and new computer and equipment systems (Sarosi 2012).

Figure 3.
Boresight Control Building



A. West Corner of Building Facing Boresight Range, Oblique View East



B. Rear (Northeast) Elevation of the Boresight Control Building and Movable Radar Tower, View Southwest

IV. NRHP EVALUATION

HMP SOUTH (M7-1212)

HMP South was built in 1964 as part of the same effort that produced the HMCA Historic District, originally known as the “Fluid Test Area.” First known as the “Hypergolic Test Building,” HMP South provided space for testing, fueling, servicing, and checkout of the Apollo spacecraft hypergolic propulsion systems (Figure 4). The building was designed by the Tampa Bay Engineering Company (NASA 1965:3-19). In 1976, the interior was remodeled by Pan American Technical Services, Inc., of Cocoa Beach, Florida, to test and service the shuttle’s forward RCS (Deming and Slovinac 2007:8-1; NASA 1984:2-11). The forward RCS worked in tandem with the shuttle’s aft RCS and Orbital Maneuvering System (OMS) pods located on either side of the tail fin, or vertical stabilizer. The aft RCS/OMS pods were processed in HMP North, which was HMP South’s companion facility in the HMCA Historic District.

At HMP South, the shuttle’s RCS system module was inspected and connected to electrical cables and propellant lines. Residual propellants were drained and the system was flushed and dried. The line replaceable units were then repaired and replaced, followed by an electrical and pneumatic checkout process. Once the systems were revalidated, the RCS module was moved out of the building for installation on the shuttle. The building also conducted electrical, tile, and thermal control system repairs on the forward RCS. Due to the hazardous nature of the hypergolic fuels, employees were required to wear full-body self-contained atmospheric protective ensemble suits and vapor concentration monitors during certain tests (Deming and Slovinac 2007:8-1).

HMP South (8BR2933) is recommended eligible for inclusion in the NRHP-eligible HMCA Historic District in the context of the U.S. Space Shuttle Program (1969-2011) under NRHP Criterion A in the area of Space Exploration. Since it has achieved significance within the past 50 years, Criteria Consideration G applies. HMP South is also recommended eligible for individual listing in the NRHP as a one-of-a-kind facility used to test and process the Space Shuttle’s forward RCS system, a key component of the shuttle vehicle system. HMP South retains all seven aspects of its physical integrity, including its location, design, setting, materials, workmanship, feeling, and association.

Figure 4.
Historic Aerial Photograph Showing HMP South Under Construction, 1963



Source: J-BOSC Environmental Health and Services 2004

BORESIGHT CONTROL BUILDING (M7-0867)

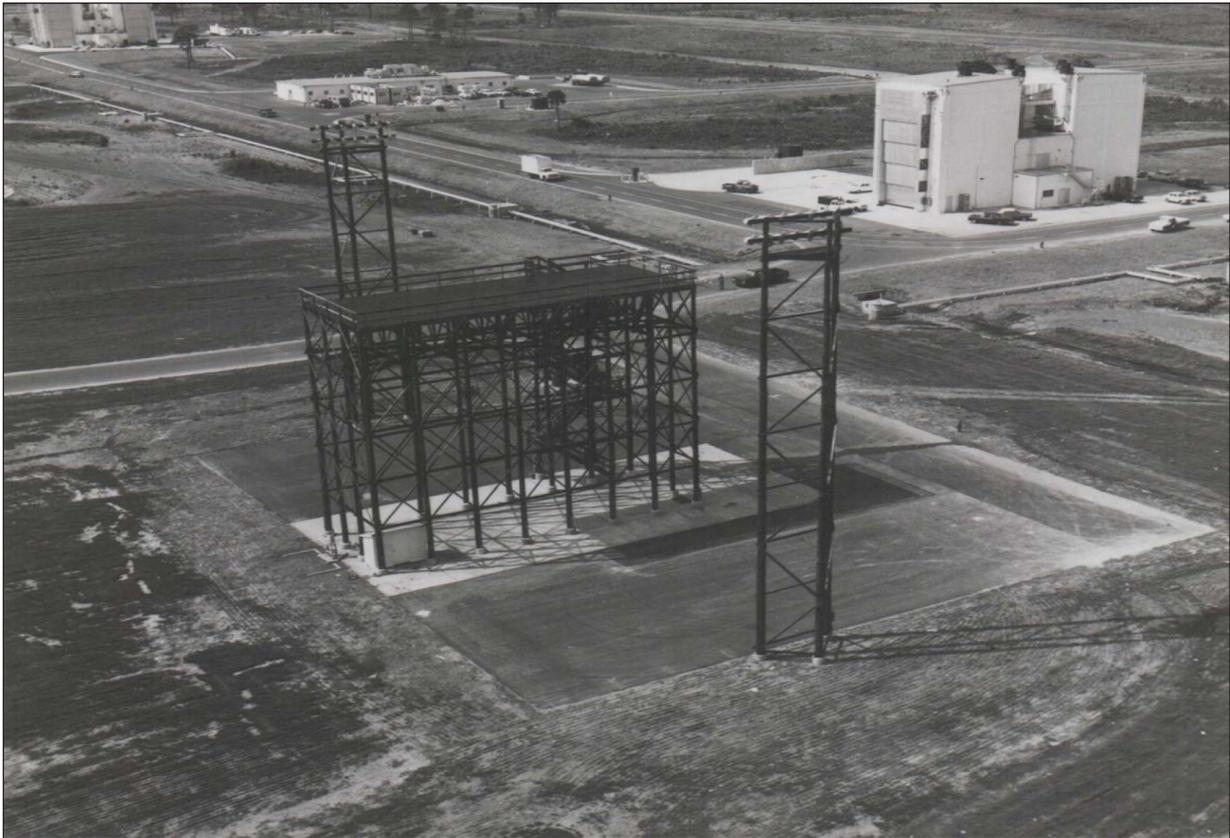
The Boresight Control Building was built on March 3, 1963, as part of a larger area called the Radar Boresight Range that tested the radiating capabilities and characteristics of antenna systems used on the Gemini spacecraft and Agena target vehicle. In addition to the Boresight Control Building, the Radar Boresight Range originally included the wooden Boresight Tower on its west end that measured 64x24x50 feet (Figure 5). Informally known as the “timber tower,” it provided a platform for testing radar equipment from the control room in the Boresight Control Building. The tower was demolished in the 1980s due to its deterioration into a safety hazard. Between the Boresight Control Building and tower is the former 1,000x200-foot graded area that provided a controlled reflective surface for radar boresight testing (J-BOSC Environmental Health and Services 2004).

The Radar Boresight Range was initially constructed to support the Gemini (1962-1966) program. It was also used by the Apollo (1968-1972) program and was then modified to support the Spaceflight Tracking and Data Network Station (STDNS). The range and its equipment were designed and furnished by Scientific-Atlanta, Inc., a company that represented the state-of-the-art ground-level antenna testing at that time. According to a 1963 NASA procurement memorandum, there were only two other existing ground level antenna ranges of this type that offered the required levels of sensitivity, accuracy, dynamic range, and operational integrity. The memorandum does not state where these two other antenna ranges were located (Eiband 1963) (Figure 6).

Following the Apollo program in the early 1970s, the Radar Boresight Range was still used to test radar systems, antennas, transponders, and other instrumentation, although its future was uncertain (NASA 1974). With the advent of the SSP, the original function of the range was made obsolete by newer radar and antenna technology used on the shuttle. In the early 1980s, the building was vacated. The building was listed in the KSC technical facilities catalogs in 1967 and 1974, but it was not listed in the 1984 catalog (NASA 1984).

According to Doug Younger, KSC Environmental Protection Specialist, the Boresight Control Building fell into disrepair in the mid-1980s and its site was used as a dump for old GSE hardware. Sometime after the Challenger disaster in 1986, the building was renovated for Space Shuttle radar and antenna testing, (i.e. new foam insulation pads, upgraded electrical, plumbing, and roof systems). It was also at this time that the railroad track and movable tower were built on the former range area to the west of the building (Younger 2012).

Figure 5.
Historic Aerial Photograph Showing Boresight Tower, 1963



Source: J-BOSC Environmental Health and Services 2004

Figure 6.
Historic Aerial Photograph of the HMCA Historic District
and Radar Boresight Range, 1969



Source: J-BOSC Environmental Health and Services 2004

The building continued to test shuttle antennas into the 1990s. By 1996, the building was used to test prototype antennas for the shuttle and was referred to by employees as the Far Field Antenna Testing Range, or just the Far Field Range. One antenna was installed in the cabin airlock and another in the cargo bay for Extravehicular Activity (EVA). This testing was done to solve problems with Ultra High Frequency (UHF) voice transmission between the shuttle and astronauts. In addition to shuttle antenna work, the building hosted similar research and development testing for outside commercial vendors (Sarosi 2012).

The Boresight Control Building was again vacated in 1998 and fell back into disrepair. In 2003, the building was partially renovated and reopened by United Space Alliance (USA) to test low frequency, UHF, and S-Band antennas associated with the SSP. At this time, working conditions in the building were difficult because years of neglect and a lack of air conditioning had caused a serious mold and animal infestation problem. Over the next few years, the building was cleaned and renovated by Wayne Sarosi, Facility Manager, and staff, including installation of new radar absorbent padding (2004), windows and a crane on the roof (2005), an air conditioner, exterior and interior paint, and new computer systems (2006). The Boresight Control Building was used for radar and antenna testing until 2011, when United Space Alliance (USA) transferred management of the building to NASA. NASA planned to use it for a fuel experiment, but it never occurred. The building was vacated for the final time and has remained unoccupied (Sarosi 2012; J-BOSC 2004).

The Boresight Control Building was part of at least two different facilities of its type that NASA operated for the SSP. The other was the Radar Boresight Range Facility located at Johnson Space Center (JSC) in Houston, Texas. The JSC Boresight Range was originally completed to test Apollo rendezvous and lunar lander radar. It was later upgraded to support shuttle systems, including Rendezvous Radar, Microwave Scanning Beam Landing System, and Tactical Air Navigation System (National Technical Information Service n.d.:170).

The Boresight Control Building is recommended not eligible to be individually listed in the NRHP, or as a contributing resource in the HMCA Historic District. The building was evaluated under NRHP Criteria A, B, and C in the context of the U.S. Space Shuttle Program (1969-2011) in the area of Space Exploration. It was also evaluated under its earlier historic context of the Gemini/Apollo programs of the 1960s.

The building was constructed in 1963 as part of the larger Radar Boresight Range, which was located northeast of the HMCA Historic District although not involved in the district's work with hypergolic fuels testing. Since this range was a distinct entity with a separate history of use, the remaining Boresight Control Building does not meet Criterion A for listing as a contributing resource in the HMCA Historic District.

In the context of its early 1960s history as part of the Radar Boresight Range and the Gemini/Apollo programs, the Boresight Control Building's physical integrity of setting, feeling, and association were compromised by the demolition of the "timber tower" and the alteration of the original graded reflective range. If the two original resources were intact then the entire range may have been eligible as a separate historic district. By itself, the Boresight Control Building does not communicate the larger historic significance of the Radar Boresight Range.

In the context of the SSP, the Boresight Control Building played a supportive role in testing a variety of antennas and radar equipment used on the shuttle; however, it did not process any critical components of the shuttle itself. By the 1980s, it was one of at least two boresight control buildings used by NASA for the SSP, with the other located at JSC in Houston, Texas. The facility at KSC has no particular significance in the history of radar or antenna testing; therefore, the Boresight Control Building is not recommended eligible for listing in the NRHP under Criterion A.

Background research did not indicate any associations with a historically significant person or people, so the Boresight Control Building is not recommended eligible for listing in the NRHP under Criterion B.

The Boresight Control Building is a utilitarian industrial-type building that does not embody the distinctive characteristics of a type, period, or method of construction. It does not represent the work of a master architect. It does not possess high artistic value. Lastly, it does not represent a significant and distinguishable entity whose components lack individual distinction. Therefore, the Boresight Control Building is recommended not eligible for listing in the NRHP under Criterion C.

IV. RESULTS AND RECOMMENDATIONS

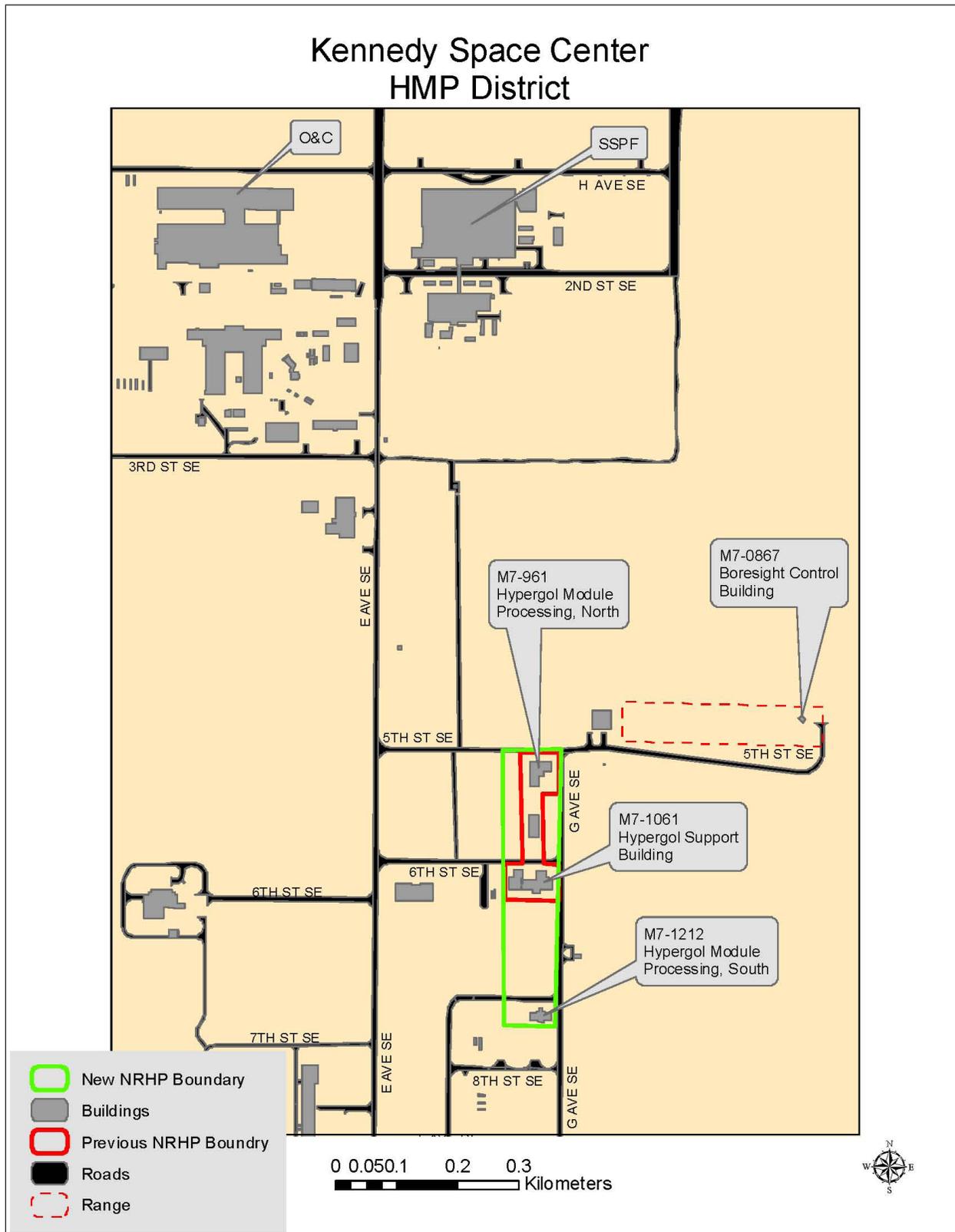
New South Associates conducted background research, a historic building survey, and NRHP evaluation of HMP South (8BR2933) and the Boresight Control Building (8BR2934) at KSC. HMP South was built in 1964 as part of the Fluid Test Area to test hypergolic fuels and was later used to process the Space Shuttle's forward RCS modules. It was built at the same time and shares a similar history as HMP North, its companion building in the Fluid Test Area, which was previously determined eligible to the NRHP as both a contributing resource in the HMCA Historic District and as an individually eligible property. HMP South is therefore recommended eligible as a contributing resource to the proposed NRHP-eligible HMCA Historic District under Criterion A in the area of Space Exploration. It is also recommended eligible for individual listing in the NRHP as a one-of-a-kind facility that was critical to the successive launches of the SSP.

HMP South is located across a wooded area directly south of the existing HMCA Historic District. It is recommended that the property be included in district's boundary; therefore, the boundary must be extended to the south approximately 750 feet. The boundaries do not need to be expanded in any other direction. This boundary expansion will add approximately 4.5 acres to the historic district (Figure 7).

With HMP South recommended eligible to the NRHP, it should be included in the planned HAER Level II documentation of the HMCA Historic District. Level II documentation requires the production of 4x5-inch archivally processed photographic views of the buildings in the district, as well as 8x10-inch photographic views of the building's as-built construction drawings.

The Boresight Control Building, built in 1963 to test radar and antennas used in the Gemini program, and later renovated to test Space Shuttle antennas, is recommended not eligible for listing in the NRHP as an individual property or as contributing to a historic district. Therefore no further work is recommended under Section 106 for this resource.

Figure 7.
HMCA Historic District Boundary Expansion



Source: NASA

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- 2008 *NASA-Wide Survey and Evaluation of Historic Facilities in the Context of the U.S. Space Shuttle Program: Roll-Up Report*. Submitted to the National Aeronautics and Space Administration, Environmental Management Branch. Sarasota, Florida: Archaeological Consultants, Inc. February 2008, revised July 2008.

Younger, Doug

- 2012 Environmental Protection Specialist, Kennedy Space Center, Environmental Assurance Branch. Interview with author, February 1, 2012.

APPENDIX A. SURVEY LOG SHEET

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) History Survey and Evaluation, Hypergol Module Processing South

Report Title (exactly as on title page) History Survey and Evaluation, Hypergol Processing South (M7-1212) and Boresight Control Building (M7-0867), John F. Kennedy Space Center, Brevard County, Florida

Report Authors (as on title page, last names first) 1. David L. Price 3. _____
2. _____ 4. _____

Publication Date (year) 2012 Total Number of Pages in Report (count text, figures, tables, not site forms) 20

Publication Information (Give series, number in series, publisher and city. For article or chapter, cite page numbers. Use the style of *American Antiquity*.)

Supervisors of Fieldwork (even if same as author) Names Mary Beth Reed

Affiliation of Fieldworkers: Organization New South Associates City Stone Mountain, GA

Key Words/Phrases (Don't use county name, or common words like *archaeology, structure, survey, architecture, etc.*)

1. Hypergol Module Processing 3. Boresight Control Building 5. _____ 7. _____
2. Kennedy Space Center 4. _____ 6. _____ 8. _____

Survey Sponsors (corporation, government unit, organization or person directly funding fieldwork)

Name InoMedic Health Applications LLC Organization _____

Address/Phone/E-mail 6141 N. Courtenay Pkwy., Suite A, Merritt Island, FL 32953,

Recorder of Log Sheet David L. Price Date Log Sheet Completed 3-13-2012

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; attach additional sheet if necessary)

1. Brevard 3. _____ 5. _____
2. _____ 4. _____ 6. _____

USGS 1:24,000 Map Names/Year of Latest Revision (attach additional sheet if necessary)

1. Name ORSINO Year 1976 4. Name _____ Year _____
2. Name _____ Year _____ 5. Name _____ Year _____
3. Name _____ Year _____ 6. Name _____ Year _____

Description of Survey Area

Dates for Fieldwork: Start 1-30-2012 End 2-3-2012 Total Area Surveyed (fill in one) _____ hectares 10 acres

Number of Distinct Tracts or Areas Surveyed 1

If Corridor (fill in one for each) Width: _____ meters _____ feet Length: _____ kilometers _____ miles

Research and Field Methods

Types of Survey (check all that apply): archaeological architectural historical/archival underwater damage assessment monitoring report other(describe): _____

Scope/Intensity/Procedures New South Assoc. conducted background research and a historic building survey of the Hypergol Module Processing South and Boresight Control Building at Kennedy Space Center to determine their eligibility in the National Register of Historic Places.

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): _____

Archaeological Methods (check as many as apply to the project as a whole)

Check here if NO archaeological methods were used. surface collection, controlled shovel test-other screen size block excavation (at least 2x2 m) surface collection, uncontrolled water screen soil resistivity shovel test-1/4" screen posthole tests magnetometer shovel test-1/8" screen auger tests side scan sonar shovel test 1/16" screen coring pedestrian survey shovel test-unscreened test excavation (at least 1x2 m) unknown 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): _____

Survey Results (cultural resources recorded)

Site Significance Evaluated? Yes No
Count of Previously Recorded Sites 0 Count of Newly Recorded Sites 2
Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8". Attach additional pages if necessary.) _____

Newly Recorded Site #'s (Are all originals and not updates? List site #'s without "8". Attach additional pages if necessary.) BR-2933 (Hypergol Module Processing South) and BR-2934 (Boresight Control Building)

Site Forms Used: Site File Paper Form Site File Electronic Recording Form

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

SHPO USE ONLY SHPO USE ONLY SHPO USE ONLY
Origin of Report: 872 CARL UW 1A32 # _____ Academic Contract Avocational
 Grant Project # _____ Compliance Review: CRAT # _____
Type of Document: Archaeological Survey Historical/Architectural Survey Marine Survey Cell Tower CRAS Monitoring Report
 Overview Excavation Report Multi-Site Excavation Report Structure Detailed Report Library, Hist. or Archival Doc
 MPS MRA TG Other: _____
Document Destination: _____ Plotability: _____



Source: USGS Orisino, Florida Quadrangle, 1976

APPENDIX B. FLORIDA MASTER SITE FILES (FMSF) SITE FORMS

Original
 Update



HISTORICAL STRUCTURE FORM

FLORIDA MASTER SITE FILE

Version 4.0 1/07

Site #8 _____
Field Date _____
Form Date _____
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) Hypergol Module Processing (HMP) South Multiple Listing (DHR only) _____
Survey Project Name KSC Survey: HMP South and Boresight Control Bldg 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

Address: Avenue G
Cross Streets (nearest / between) 7th Street
USGS 7.5 Map Name ORSINO USGS Date _____ Plat or Other Map _____
City / Town (within 3 miles) Kennedy Space Center In City Limits? yes no unknown County Brevard
Township 23S Range 37E Section 4 1/4 section: NW SW SE NE Irregular-name: _____
Tax Parcel # _____ Landgrant _____
Subdivision Name _____ Block _____ Lot _____
UTM Coordinates: Zone 16 17 Easting 535144 Northing 3153982
Other Coordinates: X: _____ Y: _____ Coordinate System & Datum _____
Name of Public Tract (e.g., park) John F. Kennedy Space Center

HISTORY

Construction Year: 1964 approximately year listed or earlier year listed or later
Original Use _____ From (year): _____ To (year): _____
Current Use _____ From (year): _____ To (year): _____
Other Use Hypergolic fuels testing/Space Shuttle From (year): 1964 To (year): 2012
Moves: yes no unknown Date: _____ Original address _____
Alterations: yes no unknown Date: 1-1-1976 Nature Interior renovation for shuttle program
Additions: yes no unknown Date: _____ Nature _____
Architect (last name first): Tampa Bay Engineering Company Builder (last name first): _____
Ownership History (especially original owner, dates, profession, etc.) National Aeronautics and Space Administration (NASA)

Is the Resource Affected by a Local Preservation Ordinance? yes no unknown Describe _____

DESCRIPTION

Style Industrial Vernacular Exterior Plan Irregular Number of Stories 2
Exterior Fabric(s) 1. Concrete block 2. Steel 3. _____
Roof Type(s) 1. Flat 2. _____ 3. _____
Roof Material(s) 1. Built-up 2. _____ 3. _____
Roof secondary strucs. (dormers etc.) 1. _____ 2. _____
Windows (types, materials, etc.) None

Distinguishing Architectural Features (exterior or interior ornaments) Exterior dominated by 22'x40' steel vertical lift doors.

Ancillary Features / Outbuildings (record outbuildings, major landscape features; use continuation sheet if needed.) Exterior chilled water storage tanks and basins, compressed air tanks, gaseous nitrogen/helium tanks, and washdown systems.

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

DESCRIPTION (continued)

Chimney: No. 0 Chimney Material(s): 1. _____ 2. _____
 Structural System(s): 1. Concrete block 2. _____ 3. _____
 Foundation Type(s): 1. Slab 2. _____
 Foundation Material(s): 1. Concrete, Generic 2. _____
 Main Entrance (stylistic details) The main entrance is on the north side of the building and consists of a pair of metal pedestrian doors.
 Porch Descriptions (types, locations, roof types, etc.) None

Condition (overall resource condition): excellent good fair deteriorated ruinous
 Narrative Description of Resource See continuation sheet.

Archaeological Remains _____ Check if Archaeological Form Completed

RESEARCH METHODS (check all that apply)

- | | | | |
|--|--|--|--|
| <input checked="" type="checkbox"/> FMSF record search (sites/surveys) | <input checked="" type="checkbox"/> library research | <input type="checkbox"/> building permits | <input type="checkbox"/> Sanborn maps |
| <input type="checkbox"/> FL State Archives/photo collection | <input type="checkbox"/> city directory | <input checked="" type="checkbox"/> occupant/owner interview | <input type="checkbox"/> plat maps |
| <input type="checkbox"/> property appraiser / tax records | <input type="checkbox"/> newspaper files | <input type="checkbox"/> neighbor interview | <input type="checkbox"/> Public Lands Survey (DEP) |
| <input checked="" type="checkbox"/> cultural resource survey (CRAS) | <input checked="" type="checkbox"/> historic photos | <input checked="" type="checkbox"/> interior inspection | <input type="checkbox"/> HABS/HAER record search |
| <input type="checkbox"/> other methods (describe) _____ | | | |

Bibliographic References (give FMSF manuscript # if relevant, use continuation sheet if needed) Survey and Evaluation of NASA-owned Historic Facilities and Properties, John F. Kennedy Space Center, Brevard County, Florida.

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) HMP South is recommended eligible for inclusion in the NRHP-eligible Hypergolic Maintenance and Checkout Area Historic District in the context of the U.S. Space Shuttle Program (1969-2010) under NRHP Criterion A in the area of Space Exploration.
 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 _____ Maintaining organization _____
 Document description _____ File or accession #'s _____

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

RECORDER INFORMATION

Recorder Name David L. Price Affiliation New South Associates
 Recorder Contact Information 6150 E. Ponce de Leon Ave., Stone Mountain, GA 30083
 (address / phone / fax / e-mail)

<p>Required Attachments</p>	<p>① USGS 7.5' MAP WITH STRUCTURE LOCATION PINPOINTED IN RED</p>
	<p>② LARGE SCALE STREET, PLAT OR PARCEL MAP (available from most property appraiser web sites)</p>
	<p>③ 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 <u>AND</u> in hard copy format (plain paper is acceptable). Digital image must be at least 1600 x 1200 pixels, 24-bit color, jpeg or tiff.</p>

HISTORICAL STRUCTURE FORM
Continuation Sheet

Hypergol Maintenance Processing (HMP) South

Narrative Description of Resource

HMP South is a concrete block building with a reinforced concrete foundation. The air-conditioned building has an irregular footprint that contains 7,100 square feet of floor area. It has two high-bay test cells, located on the east and west sides, which measure approximately 40 feet by 40 feet by 60 feet high. Each cell features three vertical-lift exterior doors, one on each exterior elevation, that measure 22 feet wide by 40 feet high and are equipped with inflatable seals for excluding contaminants. Each test cell has a 10-ton overhead bridge crane with a hook height of 45 feet. The cells have large capacity exhaust systems and a floor system which collects and dilutes hypergolic spills. Between the test cells is a two-story central area that contains control rooms, equipment rooms, and storage areas (National Aeronautics and Space Administration [NASA] 1967:10-55).

On the south side of HMP South's exterior are chilled water storage tanks and basins, compressed air tanks, gaseous nitrogen/helium tanks, washdown systems, and a contaminated effluent tank to control and contain inadvertent spilling of toxic and combustible propellants.

The interiors of HMP South's test cells contain hypergolic fuel and oxidizer servicing areas that are capable of testing and servicing the space shuttle's forward Orbital Maneuvering System (OMS) module. The east test cell contains three levels of work platforms arranged in a U shape around the outer walls. This cell was used primarily as a staging area or auxiliary test space, with the west test cell reserved as the primary area for forward OMS module processing. The west test cell contains a two-level work area. The ground level has an OMS module staging area and all of the hypergolic fuel and oxidizer pumps, lines, and gauges. Above this ground level is a steel-frame upper level work platform. The overhead bridge crane lifted the OMS module up onto this platform where it was maneuvered into different positions depending on the work performed.

The two-story central portion of HMP South contains a variety of rooms that support the test cell work areas, including a Thermal Control System (TCS) room, control room, Hardware Interface Module (HIM) room, equipment testing rooms, and central corridor. Interior spaces are typically finished with suspended acoustic tile ceilings, drywall walls, and tile floors.



Source: USGS Orisino, Florida Quadrangle, 1976

Original
 Update



HISTORICAL STRUCTURE FORM

FLORIDA MASTER SITE FILE

Version 4.0 1/07

Site #8 _____
Field Date _____
Form Date _____
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) Boresight Control Building Multiple Listing (DHR only) _____
Survey Project Name KSC Survey: HMP South and Boresight Control Bldg 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

Address: Street Number _____ Direction _____ Street Name 5th Street Type Street Suffix Direction _____
Cross Streets (nearest / between) Avenue G
USGS 7.5 Map Name ORSINO USGS Date _____ Plat or Other Map _____
City / Town (within 3 miles) Kennedy Space Center In City Limits? yes no unknown County Brevard
Township 23S Range 37E Section 4 1/4 section: NW SW SE NE Irregular-name: _____
Tax Parcel # _____ Landgrant _____
Subdivision Name _____ Block _____ Lot _____
UTM Coordinates: Zone 16 17 Easting 535572 Northing 3154472
Other Coordinates: X: _____ Y: _____ Coordinate System & Datum _____
Name of Public Tract (e.g., park) John F. Kennedy Space Center

HISTORY

Construction Year: 1963 approximately year listed or earlier year listed or later
Original Use _____ From (year): _____ To (year): _____
Current Use _____ From (year): _____ To (year): _____
Other Use NASA radar and antenna testing From (year): _____ To (year): _____
Moves: yes no unknown Date: _____ Original address _____
Alterations: yes no unknown Date: _____ Nature Interior renovations: circa 1986, 2003
Additions: yes no unknown Date: _____ Nature _____
Architect (last name first): John J. Harte Associates Builder (last name first): _____
Ownership History (especially original owner, dates, profession, etc.) National Aeronautic and Space Administration (NASA)

Is the Resource Affected by a Local Preservation Ordinance? yes no unknown Describe _____

DESCRIPTION

Style No style Exterior Plan Square Number of Stories 2
Exterior Fabric(s) 1. Concrete block 2. _____ 3. _____
Roof Type(s) 1. Flat 2. _____ 3. _____
Roof Material(s) 1. Other 2. _____ 3. _____
Roof secondary strucs. (dormers etc.) 1. _____ 2. _____
Windows (types, materials, etc.) Fixed, single-light, wood sash
Distinguishing Architectural Features (exterior or interior ornaments) N/A

Ancillary Features / Outbuildings (record outbuildings, major landscape features; use continuation sheet if needed.) Extending west from the building is a 400' railroad track with movable radar tower that were installed circa 1986 for use in testing shuttle antennas.

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

DESCRIPTION (continued)

Chimney: No. 0 Chimney Material(s): 1. 2.
Structural System(s): 1. Concrete block 2. 3.
Foundation Type(s): 1. Slab 2.
Foundation Material(s): 1. Concrete, Generic 2.
Main Entrance (stylistic details) Two pairs of metal pedestrian entrances, one on the ground floor and one on the second floor.
Porch Descriptions (types, locations, roof types, etc.) N/A

Condition (overall resource condition): []excellent [x]good []fair []deteriorated []ruinous
Narrative Description of Resource See continuation sheet.

Archaeological Remains []Check if Archaeological Form Completed

RESEARCH METHODS (check all that apply)

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

Bibliographic References (give FMSF manuscript # if relevant, use continuation sheet if needed) Survey and Evaluation of NASA-owned Historic Facilities and Properties in the Context of the U.S. Space Shuttle Program, John F. Kennedy Space Center, Brevard County, Florida (October 2007).

OPINION OF RESOURCE SIGNIFICANCE

Appears to meet the criteria for National Register listing individually? []yes [x]no []insufficient information
Appears to meet the criteria for National Register listing as part of a district? []yes [x]no []insufficient information
Explanation of Evaluation (required, whether significant or not; use separate sheet if needed) See continuation sheet.

Area(s) of Historical Significance (see National Register Bulletin 15, p. 8 for categories: e.g. "architecture", "ethnic heritage", "community planning & development", etc.)
1. 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 New South Associates
Document description Survey report, photos, notes. File or accession #'s
2) Document type Maintaining organization
Document description File or accession #'s

RECORDER INFORMATION

Recorder Name David L. Price Affiliation New South Associates
Recorder Contact Information 6150 E. Ponce de Leon Ave., Stone Mountain, GA 30083
(address / phone / fax / e-mail)

Required Attachments
1 USGS 7.5' MAP WITH STRUCTURE LOCATION PINPOINTED IN RED
2 LARGE SCALE STREET, PLAT OR PARCEL MAP (available from most property appraiser web sites)
3 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.

HISTORICAL STRUCTURE FORM
Continuation Sheet

Boresight Control Building – Kennedy Space Center, FL

Narrative Description of Resource

The Boresight Control Building is located just northeast of the Hypergol Maintenance and Checkout Area (HMCA) Historic District. It is a two-story concrete block building with a reinforced concrete foundation. The block-shaped building measures 20 feet by 20 feet by 20 feet. There is a mechanical room on the first floor, a control room on the second floor, and a pedestal on the roof for mounting a test antenna. There is also a crane on the roof for lifting equipment from the ground (NASA 1974:10-67). There are two fixed single-light windows on the building's second story that face west toward the antenna range. Extending west from the building is an approximately 400-foot long railroad track equipped with a movable radar test tower. The track and tower were installed circa 1986 when the building was refurbished for the Space Shuttle Program. Adjacent to the southwest elevation is a telephone pole.

The building is accessed via double pedestrian doors on the northeast elevation at the ground and second levels. There is a single pedestrian door on the ground level of the southeast elevation. The northeast elevation also has a two-story steel staircase that leads to the second floor entrance and to the roof. The staircase is shielded on its north side by an approximately 5-foot by 20-foot wing wall. The perimeter of the roof is lined by a metal safety railing. The west end of the test antenna on the roof is shielded by blocks of foam padding that is in deteriorated condition. Similar foam padding is stacked in a column on the northwest elevation.

The most recent renovation of the building occurred in 2006, when staff repaired and painted the roof, exterior, and control room. Staff also installed new windows, a roof crane, radar absorbent padding, and computer and equipment systems (Sarosi 2012).

Explanation of Evaluation

The Boresight Control Building is recommended *not eligible* to be individually listed in the NRHP, or as a contributing resource in the HMCA Historic District. The building was evaluated under NRHP Criteria A, B, and C in the context of the U.S. Space Shuttle Program (1969-2011) in the area of Space Exploration. The building was also evaluated under its earlier historic context of the Gemini/Apollo programs of the 1960s.

The building was completed in 1963 as part of the larger Radar Boresight Range, which was located northeast of the HMCA Historic District, however, was not involved in the district's work with hypergolic fuels testing. Since this range was a distinct entity with a separate history of use, the remaining Boresight Control Building does not meet Criterion A for listing as a contributing resource in the HMCA Historic District.

In the context of its early 1960s history as part of the Radar Boresight Range and the Gemini/Apollo programs, the Boresight Control Building's physical integrity of setting, feeling, and association were compromised by the demolition of the "timber tower" and the alteration of the original graded reflective range. If these two original resources remained intact then the entire range may have been eligible as a separate historic district, but by itself the Boresight Control Building does not communicate the larger historic significance of the Radar Boresight Range.

In the context of the Space Shuttle Program (SSP), the Boresight Control Building played a supportive role in testing a variety of antennas and radar equipment used on the shuttle, it did not process any critical components of the shuttle itself. By the 1980s, it was one of at least two boresight control buildings used by NASA for the SSP, with the other located at JSC in Houston, Texas. The Boresight Control Building at KSC has no particular significance in the history of radar or antenna testing, therefore, the facility is not recommended eligible for listing in the NRHP under Criterion A.

Background research did not indicate any associations with a historically significant person or people, so the Boresight Control Building is not recommended eligible for listing in the NRHP under Criterion B.

The Boresight Control Building is a utilitarian industrial-type building that does not embody the distinctive characteristics of a type, period, or method of construction. It does not represent the work of a master architect. It does not possess high artistic value. Lastly, it does not represent a significant and distinguishable entity whose components lack individual distinction. Therefore, the Boresight Control Building is recommended not eligible for listing in the NRHP under Criterion C.



Source: USGS Orisino, Florida Quadrangle, 1976

