WHITE SANDS SPACE HARBOR AREA 1, CONTROL TOWER
(Space Shuttle Landing Facility Area 1, Control Tower)
White Sands Missile Range
Approximately 3,500 feet southwest of intersection of Runways 17/35 and 23/05
White Sands vicinity
Doña Ana County
New Mexico

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
U.S. Department of the Interior
Intermountain Regional Office
12795 Alameda Parkway
Denver, CO 80225-0287
HISTORIC AMERICAN ENGINEERING RECORD

WHITE SANDS SPACE HARBOR AREA 1
(Space Shuttle Landing Facility Area 1, Control Tower)

HAER No. NM-28-D

Location: White Sands Missile Range
Approximately 3,500’ southeast from intersection of
Runways 17/35 and 23/05
White Sands vicinity
Doña Ana County
New Mexico

U.S.G.S. 7.5 Minute Las Cruces, New Mexico,
Quadrangle, Universal Transverse Mercator Coordinates:
E 32.93827 N 106.41034 Zone 13S, NAD 1983

Construction: 1979

Architect: Dennis G. Perrin, NASA WSTF engineer

Builder: Not known

Present Owner: Commander, U.S. Army White Sands Missile Range,
New Mexico 88002-5018

Present Use: Vacant

Significance: The Air Traffic Control Tower, commonly known as the
“Control Tower,” was an essential component of the
White Sands Space Harbor (WSSH) from 1976-2011. The
Control Tower has a direct association with the U.S.
Space Shuttle Program (SSP) as the site of the landing of
Space Transportation System (STS)-3 Columbia in
March 1982; this is the only STS landing to take place outside Edwards Air Force Base in California and
Kennedy Space Center in Florida. The Control Tower is
considered to have national significance and is
eligible for listing in the National Register of
Historic Places (NRHP) under Criterion A for its
association with the NASA SSP with a period of
significance of 1976-2011. Because it achieved
significance within the past fifty years, Criterion
Consideration G also applies.
Report
Prepared by: Robbie D. Jones, Senior Historian
New South Associates
118 South 11th Street
Nashville, TN  37206

Date: September 2013

LIST OF ACRONYMS

ABGR  Alamogordo Bombing and Gunnery Range
ABS  Anti-lock Braking System
ACHP  Advisory Council on Historic Preservation
ACI  Archaeological Consultants, Inc.
AIAA  American Institute of Aeronautics and Astronautics
APE  Area of Potential Effects
ATC  Air Traffic Control
BTT  Basic Training Target
CCC  Civilian Conservation Corps
CIT  California Institute of Technology
CONEX  Container Express
DC-X  Delta Clipper, Experimental
DoD  Department of Defense
GPS  Global Positioning System
HAFB  Holloman Air Force Base
HPO  Historic Preservation Officer
HPWG  Historic Preservation Working Group
HUB  Harbor Utility Building
IGS  Inter Glide Slope
IHA  InoMedic Health Applications, LLC
JSC  Johnson Space Center
KSC  Kennedy Space Center
LC  Launch Complex
MD  McDonnell Douglas
MSBLS  Microwave Scanning Beam Landing System
MSFC  Marshall Space Flight Center
NASA  National Aeronautics and Space Administration
NAVAIDS  Navigational Aids
NEPA  National Environmental Policy Act
NHL  National Historic Landmark
NHPA  National Historic Preservation Act
NPS   National Park Service
NRHP  National Register of Historic Places
NSA   New South Associates
OCC   Operations Control Center
ORD   Army Ordinance Department
PAPI  Precision Approach Path Indicator
RFP   Request for Proposal
SCAPE Self Contained Atmospheric Protective Ensemble
SHPO  State Historic Preservation Officer
SSP   Space Shuttle Program
SSRT  Single Stage Rocket Technology
STA   Shuttle Training Aircraft
STS   Space Transportation System
TACAN Tactical Air Navigation
TAL   Transoceanic Abort Landing
UHF   Ultrahigh Frequency
USAAF United States Army Air Force
USAF  United States Air Force
VITT  Vehicle Integration Test Team
WPA   Works Progress Administration
WSMR  White Sands Missile Range
WSNM  White Sands National Monument
WSPG  White Sands Proving Ground
WSSH  White Sands Space Harbor
WSTF  White Sands Test Facility
PART I. HISTORICAL INFORMATION

A. PHYSICAL HISTORY

1. DATE OF CONSTRUCTION

The cab section of the Control Tower was originally located at NASA’s Ellington Field in Houston, Texas. In May 1976, it was relocated to WSSH. At that time, the cab was attached to an Elevated Mobile Platform. In 1979, the mobile Control Tower was modified into its current configuration by attaching the original cab to a stationary structure at WSSH.

2. ENGINEER

Dennis G. Perrin, NASA WSTF Facility Manager, is the engineer-of-record for the 1979 modifications.

3. BUILDER/CONTRACTOR/SUPPLIER

None identified.

4. ORIGINAL PLANS

In the spring of 1979, NASA WSTF Facility Manager and engineer Dennis G. Perrin drafted a set of engineering drawings with the assistance of Lockheed Martin contract employee J.A. “Andy” Dorris. Robert Maveety served as engineering supervisor and Ken Blair as drafting supervisor. There are four sheets of drawings, including a site plan, base foundation plan, plan view, elevations, and construction details (Figures 7-10). The drawings are designated “594-1222B.”

5. ALTERATIONS AND ADDITIONS

The original Air Traffic Control Tower consisted of a cab unit attached to an Elevated Mobile Platform. In May 1976, the Mobile Air Traffic Control Tower was relocated from NASA’s Ellington

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Field at Houston, Texas, to WSSH via a flatbed truck. The Mobile Control Tower’s cab unit was raised and lowered on pneumatic scissor jacks and moved on a mobile platform. The extreme desert weather, however, quickly damaged the cab’s mechanical elements so that it could no longer be raised and lowered.

In the spring of 1979, WSSH Project Manager Alex Paczynski requested WSTF Facility Manager Dennis G. Perrin to create a set of plans so the mobile Control Tower could be modified into a stationary Control Tower. Perrin’s plans resulted in the rectangular cab being removed from the mobile platform and mounted atop a repurposed Apollo Propulsion Test Stand with structural parts salvaged from the WSTF. The octagon-shaped support structure was mounted to concrete foundation piers. The alterations were completed by NASA staff and private contractors on site with the assistance of two mobile cranes.²

Since 1979, alterations to the Control Tower have been minimal. By April 1980, two wooden 75’ tall poles with radio communication antennas were erected on the north and south sides of the tower. Around 1982, a cantilevered walkway was constructed to the north, west, and south elevations of the bridge, connecting to the original walkway atop the support structure. The walkway was added so that the exterior windows could be more easily cleaned.³

The entire structure was originally painted canary yellow with the “worm” NASA logotype in black on the north and south sides of the bridge. The yellow color had been selected by Dennis G. Perrin so that the Control Tower would be visible to low-flying military jets. By the late 1980s, the tower had been repainted white with the red “worm” NASA logotype on the north and south sides. This logo was in use from 1975 to 1992. In the 1990s, the original logo was painted over.⁴

² Perrin, 2013.
³ Perrin, 2013.
⁴ Perrin, 2013.
PART II. STRUCTURAL/DESIGN INFORMATION

A. GENERAL DESCRIPTION

1. CHARACTER

The lone purpose-built facility was the Control Tower (NASA Inventory #1000), which NASA engineers created in 1979 by attaching the cab from a Mobile Air Traffic Control Tower to a repurposed Apollo Propulsion Test Stand relocated from the WSTF on the opposite side of the San Andres Mountains. The Control Tower housed the ground-based controller who directed aircraft on the ground and through controlled airspace. With a 360-degree elevated view of the desert, the controller provided information and other support for pilots in order to prevent collisions, provide weather and navigation information, and organize landings.

From 1979-2012, the Control Tower was located 3,000' southeast of the centerline of where Runway 17/35 and Runway 23/05 intersected, allowing controllers a 90-degree view of both runways. This was the first permanent NASA support structure constructed at the Northrup Strip. Two small, prefabricated metal generator and support buildings were located east of the Control Tower.

Standing two stories tall, the steel cab faced northwest with flat-pane windows on the north, west, and south sides and a pedestrian door on the east side. Measuring 12'6" x 10'5", the cab was bolted to an octagon-shaped, steel base supported by four, circular steel columns, which were bolted to four concrete foundation pads forming a 12' square. The pads measured 3' x 2'. Each side of the octagon based measured 6-feet in length. A metal staircase was bolted to the east side and supported by a concrete foundation pad at the landing, which later connected to a concrete sidewalk leading to the adjacent HUB Maintenance Facility.

A 2' wide observation platform and walkway with metal railings surrounded the exterior of the bridge. Originally, the platform only partially surrounded the bridge, on the north, south, and
east sides. However, it was later reconfigured and enlarged so that it surrounded all four sides of the cab, which cantilevers over the west side of the base, so that the windows could be more easily cleaned. A ladder in the northeast corner provides access to the roof of the cab.

By April 1980, two wooden poles approximately 75’ tall were erected on the north and south sides of the Control Tower; they were originally used to host radio communication antennas as well as fly flags for determining wind direction and other weather conditions. The poles also allowed low-flying military jets to avoid striking the Control Tower.5

The interior of the cab features wood paneling, floor carpeting, and an L-shaped wood counter on the north and west sides. A closet is located in the southwest corner. An air conditioning unit is located in the northeast corner. Modern blinds protect the windows.

2. CONDITION OF FABRIC

When documented in March 2012, the Control Tower had been abandoned for over six months and vacated, but was in overall good condition. The interior equipment had been removed, but the attached furnishings were in place. The exterior was showing signs of neglect due to the harsh desert environment, which requires that facilities are constantly maintained and repaired due to shifting sands, flash floods, and extreme temperature variations. The exterior was exhibiting some rust, particularly around the base.

As a condition of a Memorandum of Agreement executed between NASA, the U.S. Army and the NM-SHPO in August 2012, the Control Tower was relocated from WSSH to the WSMR Museum in the summer of 2012 where it was placed in storage for future exhibition and public interpretation.

5 Perrin, 2013.
B. CONSTRUCTION

In 1979, the original Mobile Air Traffic Control Tower was modified into its current stationary configuration based on engineering plans prepared by NASA WSTF Facility Manager Dennis G. Perrin. The original cab, which had been relocated from NASA’s Ellington Field in Houston in May 1976, was mounted atop a repurposed Apollo Propulsion Test Stand that had been salvaged from a “HD-1 Rig” at the WSTF. Other structural elements such as the octagon-shaped base were also salvaged from the WSTF. The metal frame cab was bolted and welded to the carbon steel structural base, which was bolted to concrete foundation pads. The modified Control Tower structure was then cleaned and primed with zinc chromate primer and painted with two coats of exterior grade enamel paint. The plans specified flat white paint, but photographs from the early 1980s document that it was painted canary yellow with the original NASA “worm” logo in black lettering on the north and south sides of the bridge. By the late 1980s, it had been repainted white with the “worm” logo in red lettering. In the 1990s, the logo was painted over in white paint.6

C. MECHANICAL/OPERATION

The Control Tower featured electricity to power interior lights, electronic navigational equipment, radios, and a wall-mounted air conditioning unit.

PART III. SOURCES OF INFORMATION

A. ENGINEERING PLANS AND DRAWINGS

The construction plans for the Control Tower are housed at White Sands Test Facility, administered by NASA. There are four sheets of drawings, including a site plan, base foundation plan, plan view, elevations, and construction details. On each sheet, the original drawing date of April 19, 1979, is noted in the title block. The plans were approved and released on June 28, 1979.

B. EARLY VIEWS AND HISTORICAL DATA

Historic photographs and maps of the WSSH, including the Control Tower, are very limited. Some of these views can be found on pages 28-30 of this document. All views are captioned and dated as available. The other historical data comes from a variety of sources cited in the Bibliography below.

The historic photographs and most of the historical data used in this documentation came from sources within WSTF and WSSH. Other more current imagery was obtained from the online WSTF Media Archive. Many of the original photographs have been donated to the WSMR Museum for digitization and curation. A body of recent aerial photographs were located and photocopied for inclusion in the HAER document to supplement the current ground photography.

C. INTERVIEWS

The following NASA and WSMR employees were interviewed for this documentation.

Robert E. Mitchell, WSTF Manager, September 2011.

Frank Offutt, WSSH Manager, September 2011.

Timothy Davis, WSTF Historic Preservation Officer, September 2011 and March 2012.
D. BIBLIOGRAPHY


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United States Army. “Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and
E. LIKELY SOURCES NOT YET INVESTIGATED

Research was conducted at WSSH and WSTF using primary and secondary sources. Sources that were not investigated that may contain secondary information are archived at NASA’s Lyndon B. Johnson Space Center in Houston, Texas.

Additional oral history interviews with other engineers and technicians could also prove useful.
PART IV. PROJECT INFORMATION

In 2011-2012, New South Associates (NSA), under contract with InoMedic Health Applications, LLC (IHA) of Kennedy Space Center, Florida, and in coordination with NASA and the U.S. Army, conducted background research and a historic architecture survey of resources at the NASA WSSH. The survey included the documentation and evaluation for NRHP eligibility for seventy-two resources located in four distinct areas. Based on this research, NSA determined that no properties remain at WSSH from the period prior to NASA acquisition in 1963 except for the footprint of the packed gypsum Runway 17/35.7

NSA recommended that the three NASA WSSH Runways and the Control Tower in Area 1 were individually eligible for listing in the NRHP and eligible as contributing resources to the “WSSH Shuttle Landing Facility District” under Criterion A and Criterion Consideration G for their association with the NASA SSP. None of the other sixty-eight inventoried properties were recommended individually eligible for listing in the NRHP due to lack of historical association with the NASA SSP or other historic contexts, lack of unique design or construction features, or insufficient integrity; however, nineteen of these properties, all of which lie within Area 1, were recommended as contributing resources to “WSSH Shuttle Landing Facility District,” even though they were not recommended individually eligible for the NRHP. The historic district contains a total of twenty-eight resources: twenty-three are contributing and five are non-contributing.

After formally ending the SSP on August 31, 2011, NASA disposed of the WSSH and released use of the property to the U.S. Army WSMR. The property transfer was a federal undertaking on federally-owned property and subject to compliance with Section 106 of the NRHP Act of 1966, as amended. The undertaking resulted in an Adverse Effect to the NRHP-eligible WSSH Shuttle

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Landing Facility District. To mitigate the adverse effects, NASA completed HAER Level II documentation of the historic district and relocated the Control Tower to the WSMR Museum for conservation, exhibition, and public interpretation.

The mitigation plan was defined in a Memorandum of Agreement (MOA), executed between NASA, the U.S. Army, and the NM-SHPO in August 2012. The properties within the historic district were documented with large format photography in March 2012.
APPENDIX- LOCATION MAPS AND HISTORICAL VIEWS
Figure 1. Map of White Sands Military Reservation showing White Sands Space Harbor (Source: U.S. Army).
Figure 2. Map of White Sands Space Harbor showing location of the Control Tower in Area 1, which delineates the NRHP boundaries of the WSSH Space Shuttle Landing Facility District (Source: NASA WSTF).
Figure 3. Map of WSSH HUB complex showing the location of the Control Tower (Site Plan Source: NASA WSTF).
Figure 4. Map of White Sands Space Harbor showing the Mobile Air Traffic Control Tower, 1978, USGS Topographical Map.
Figure 5. Map of WSSH, drawn by J.A. Dorris on March 7, 1980, showing location of the stationary Control Tower as well as an enlarged site plan of the Control Tower Area (Source: NASA WSTF).
Figure 6. Enlarged section of the Map of WSSH, drawn by J.A. Dorris on March 7, 1980, showing the Control Tower Area (Source: NASA WSTF).
Figure 7. Engineering Plan Sheet, drawn by Dennis G. Perrin, April 1979: 1 of 4 (Source: NASA WSTF).
Figure 8. Engineering Plan Sheet, drawn by Dennis G. Perrin, April 1979: 2 of 4 (Source: NASA WSTF).
Figure 9. Engineering Plan Sheet, drawn by Dennis G. Perrin, April 1979: 3 of 4 (Source: NASA WSTF).
Figure 10. Engineering Plan Sheet, drawn by Dennis G. Perrin, April 1979: 4 of 4 (Source: NASA WSTF).
Figure 11A. View of Control Tower, looking northwest, after the cantilevered observation walkway was added, ca.1982 (Source: NASA WSTF).

Figure 11B. View of Control Tower, looking west, ca.1982 (Source: NASA WSTF).
Figure 12. View of the Control Tower interior, looking north, ca.2005; shown here is Alex S. Paczynski, WSSH Project manager from 1976-1995 (Source: NASA WSTF).
Figure 13. View of the Control Tower interior, looking north, ca.2005 (Source: NASA WSTF).
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White Sands Missile Range
Approximately 3,500 feet southwest of intersection of Runways 17/35
and 23/05
White Sands vicinity
Doña Ana County
New Mexico

David Diener, Photographer       March 27-29, 2012

NM-28-D-1    PROFILE OF NORTH ELEVATION OF CONTROL TOWER LOOKING
             SOUTHWEST.

NM-28-D-2    PROFILE OF WEST ELEVATION OF CONTROL TOWER LOOKING
             SOUTHEAST.

NM-28-D-3    PROFILE OF WEST AND SOUTH ELEVATIONS OF CONTROL TOWER
             LOOKING EAST.

NM-28-D-4    PROFILE OF SOUTH ELEVATION OF CONTROL TOWER LOOKING
             NORTHEAST.

NM-28-D-5    ENTRANCE STAIRCASE OF CONTROL TOWER LOOKING NORTHWEST.

NM-28-D-6    INTERIOR OF CONTROL TOWER FROM DOORWAY LOOKING
             NORTHWEST.
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