WHITE SANDS SPACE HARBOR AREA 1, RUNWAY 20/02
(Space Shuttle Landing Facility Area 1, Runway 20/02)
White Sands Missile Range
Extending 19,800 feet in a southwest/northeast direction, connecting with 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, RUNWAY 20/02
(Space Shuttle Landing Facility Area 1, Runway 20/02)

HAER No. NM-28-C

Location: White Sands Missile Range
Extending 19,800' in a southwest/northeast direction, connecting with Runway 17/35 and Runway 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 (center of runways): E 32.944408 N 106.41993 Zone 13S, NAD 1983.

Construction: 1988

Architect: Not known

Builder: Not known

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

Present Use: Vacant

Significance: Runway 20/02 was an essential component of the White Sands Space Harbor (WSSH) from 1988-2011. It 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 Space Shuttle Program (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

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>ABGR</td>
<td>Alamogordo Bombing and Gunnery Range</td>
</tr>
<tr>
<td>ABS</td>
<td>Anti-lock Braking System</td>
</tr>
<tr>
<td>ACHP</td>
<td>Advisory Council on Historic Preservation</td>
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<tr>
<td>ACI</td>
<td>Archaeological Consultants, Inc.</td>
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<tr>
<td>AIAA</td>
<td>American Institute of Aeronautics and Astronautics</td>
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<tr>
<td>APE</td>
<td>Area of Potential Effects</td>
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<tr>
<td>ATC</td>
<td>Air Traffic Control</td>
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<tr>
<td>BTT</td>
<td>Basic Training Target</td>
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<tr>
<td>CCC</td>
<td>Civilian Conservation Corps</td>
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<td>CIT</td>
<td>California Institute of Technology</td>
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<td>CONEX</td>
<td>Container Express</td>
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<td>DC-X</td>
<td>Delta Clipper, Experimental</td>
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<td>DoD</td>
<td>Department of Defense</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>HAFB</td>
<td>Holloman Air Force Base</td>
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<td>HPO</td>
<td>Historic Preservation Officer</td>
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<td>Historic Preservation Working Group</td>
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<td>HUB</td>
<td>Harbor Utility Building</td>
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<td>IGS</td>
<td>Inter Glide Slope</td>
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<td>IHA</td>
<td>InoMedic Health Applications, LLC</td>
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<td>JSC</td>
<td>Johnson Space Center</td>
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<td>KSC</td>
<td>Kennedy Space Center</td>
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<td>LC</td>
<td>Launch Complex</td>
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<td>MD</td>
<td>McDonnell Douglas</td>
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<tr>
<td>MSBLS</td>
<td>Microwave Scanning Beam Landing System</td>
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<td>MSFC</td>
<td>Marshall Space Flight Center</td>
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<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
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<td>NAVAIDS</td>
<td>Navigational Aids</td>
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<td>NEPA</td>
<td>National Environmental Policy Act</td>
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<td>NHL</td>
<td>National Historic Landmark</td>
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<td>NHPA</td>
<td>National Historic Preservation Act</td>
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</table>
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
WSH White Sands Space Harbor
WSTF White Sands Test Facility
PART I. HISTORICAL INFORMATION

A. Physical History

1. DATE OF CONSTRUCTION

Runway 20/02 was constructed in 1988.

2. ENGINEER

Not known.

3. BUILDER/CONTRACTOR/SUPPLIER

Not known.

4. ORIGINAL PLANS

A single sheet of to-scale engineering drawings were created in 1988 for Runway 20/02. The engineer-of-record is unknown.

5. ALTERNATIONS AND ADDITIONS

The Runway is constructed of a compacted, natural gypsum surface and has been upgraded with modern navigational aids such as lighting and asphalt directional markings.

Once the runway was abandoned in 2011, routine maintenance ceased. Due to the harsh desert environment, the runway began to deteriorate quickly. The U.S. Army initiated occupation of WSSH in the summer of 2012.
PART II. STRUCTURAL/DESIGN INFORMATION

A. GENERAL DESCRIPTION

1. CHARACTER

Located in Area 1, the three natural surface gypsum runways, including Runway 20/02, are located within a 10-square mile area at WSSH. The runways are constructed of compacted gypsum sand with a 1-2” thick soft top layer and a hard-paced under layer. Due to the harsh desert environment, the runways required constant grading, repairs, and maintenance.

Each of the three runways duplicates a shuttle landing runway: 17/35 replicates the runway at Kennedy Space Center in Florida; 23/05 replicates the runway at Edwards Air Force Base in California; and 20/02 replicates the Transoceanic Abort Landing (TAL) runways in other countries.

Runway 20/02 is located in the northwest quadrant created by the intersection of Runways 17/35 and 23/05. Runway 20/02 is oriented along a northeast-southwest axis and measures 19,800' in length and 200' in width. This runway does not feature maintained overruns. Navigational aids such as lighting and markings made of asphalt are located along its entire length.

At 6,500’ from the northeast end of runway 20 is the Nominal Aimpoint and at 5,500’ is the High-Wind Aimpoint with PAPI lights. At 2,000’ into the runway at the northeast end are the IGS Bar/Ball lights.

2. DESCRIPTION

The following is a more detailed description of Runway 20/02, also known as “TAL.”

Runway 20/02 is smaller than the other two runways, measuring 19,800’ by 200’. This natural surface gypsum runway is located on a northeastern/southwestern diagonal direction along the north side of the other two runways. The runway features runway markings and navigational aids, including: one set of Precision
Approach Path Indicator (PAPI) lights, touchdown markers, distance-to-go markers, xenon lights, and nominal night strobes. This runway was constructed to replicate the following runways: Transoceanic Abort Landing (TAL) runways at Zaragoza Air Base in Spain; Moron Air Base in Spain; and Istres Air Base in France, as well as former runways at Ben Guerir Air Base, Morocco (1988-2002); Casablanca, Morocco (1986-1988); and Banjul International Airport, The Gambia (1988-2002). Like the other two runways at WSSH, Runway 20/02 was used primarily for astronaut training after 1984, with Shuttle pilots simulating landings at Transatlantic Abort Landing sites.

3. CONDITION OF FABRIC

When documented in March 2012, the Runway had been abandoned for over six months and was in fair condition. Due to the harsh desert environment and lack of maintenance, the runway had quickly deteriorated due to shifting sands, flash floods, and extreme temperature variations.

B. CONSTRUCTION

The Runway is constructed of compacted natural surface gypsum with landing aid markings made of asphalt.

C. MECHANICAL/OPERATION

The Runway does not feature any mechanical equipment, with the exception of navigational aids, which are documented separately.
PART III. SOURCES OF INFORMATION

A. ENGINEERING PLANS AND DRAWINGS

A single sheet of to-scale engineering drawings were created in 1988 for Runway 20/02. The engineer-of-record is unknown. In addition, plans were created around 1988 for construction of the asphalt navigational markings.

B. EARLY VIEWS AND HISTORICAL DATA

Historic photographs and maps of the WSSH, including the Runways, are very limited. Some of these views can be found on pages 20-23 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.

Bill Godby, WSMR Historic Preservation Officer, September 2011.
D. BIBLIOGRAPHY


United States Army. “Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and
Major Capabilities at White Sands Missile Range,
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Mr.aspx, accessed September 19, 2011.

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 17/35.1

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

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 Runway 20/02 in Area 1, which delineates the NRHP boundaries of the WSSH Shuttle Landing Facility District (Base Map Source: NASA WSTF).
Figure 3. Map of WSSH showing location of all three of the Runways, with latitude and longitude, 2008 (Source: NASA WSTF).
Figure 4. Engineering Plan Sheet and Landing Aid Markings, Runway 20/02, ca.1988 (Source: NASA WSTF).
Figure 5. Drawing of Runway Landing Aids Markings, ca.1988
(Source: NASA WSTF).
Figure 6. Aerial view of Runway 20/02, looking Northwest towards the San Andres Mountain Range, undated (Source: NASA WSTF).
Figure 7. Aerial view of Runway 20/02, looking North towards the Sacramento Mountains, 2006 (Source: NASA WSTF).
Figure 8. Aerial view of Runway 20/02, looking West towards the San Andres Mountain Range, 2007 (Source: NASA WSTF).
Figure 9. Aerial view of Runway 17/35 (Foreground) and Runway 20/02 (Background), looking Southwest towards the San Andres Mountains, 2006 (Source: NASA WSTF).
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David Diener, Photographer        March 27-29, 2012

NM-28-C-1 CONTEXT VIEW OF RUNWAYS LOOKING NORTHWEST TOWARDS SAN ANDRES MOUNTAINS FROM OPERATIONS CONTROL CENTER (AREA 3).

NM-28-C-2 VIEW OF RUNWAY 20/02 LOOKING NORTHEAST FROM SOUTH END WITH ASPHALT “2” MARKING IN FOREGROUND.

NM-28-C-3 VIEW OF RUNWAY 20/02 LOOKING SOUTHWEST FROM NORTH END WITH ASPHALT “20” MARKING IN FOREGROUND AND SAN ANDRES MOUNTAINS IN BACKGROUND.
INDEX TO PHOTOGRAPHS

RUNWAY 02, 05, 17, 20, 23 & 35 AREA MAP

LEGEND:
- Area 1
- Area 2
- Area 3
- Area 4

Photo Location

North

0 3000 6000 Feet

Runway 20/02

HAER No. NM-28-C

WHITE SANDS SPACE HARBOR AREA 1, RUNWAY 20/02

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