

WHITE SANDS SPACE HARBOR AREA 1,

HAER No. NM-28-P

MICROWAVE SCANNING BEAM LANDING GROUND STATIONS

(Space Shuttle Landing Facility Area 1, Microwave Scanning Beam
Landing Ground Stations)

White Sands Missile Range

1,500' to the south of the north end of Runway 17/35; 1,500' to the
west of the east end of Runway 23/05; and 1,500' southwest of the
northeast end of Runway 20/02.

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,
MICROWAVE SCANNING BEAM LANDING GROUND STATIONS
(Space Shuttle Landing Facility Area 1, Microwave Scanning Beam
Landing Ground Stations)

HAER No. NM-28-P

Location: White Sands Missile Range
1,500' to the south of the north end of Runway 17/35;
1,500' to the west of the east end of Runway 23/05;
and 1,500' southwest of the northeast end of Runway
20/02.
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: ca.1992

Architect: Not known

Builder: Not known

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

Present Use: Vacant

Significance: The Microwave Scanning Beam Landing
Ground Stations were an essential component of the
White Sands Space Harbor (WSSH) from 1992-2011. They
are considered to have national significance and are
eligible for listing in the National Register of
Historic Places (NRHP) under Criterion A for their
association with the NASA Space Shuttle Program (SSP)
with a period of significance of 1976-2011. Because
they 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

WHITE SANDS SPACE HARBOR AREA 1, MICROWAVE SCANNING BEAM LANDING
GROUND STATIONS
HAER No. NM-28-P
(Page 3)

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 Microwave Scanning Beam Landing Ground Stations were installed ca.1992.

2. ENGINEER

Not known.

3. BUILDER/CONTRACTOR/SUPPLIER

Not known.

4. ORIGINAL PLANS

Not available.

5. ALTERATIONS AND ADDITIONS

All electronic equipment was removed once the facility was vacated in 2011. The U.S. Army initiated occupation and reuse of the facility in the summer of 2012.

PART II. STRUCTURAL/DESIGN INFORMATION

A. GENERAL DESCRIPTION

1. CHARACTER

Each of the three runways at WSSH featured a Microwave Scanning Beam Landing Ground Station (NASA Inventory #62-67), which housed the Microwave Scanning Beam Landing System (MSBLS) that guided the Space Shuttle orbiter's final landing approach. Each station contained rectangular, flanking buildings on concrete pads. The stations were located 1,500' to the south of the north end of Runway 17/35; 1,500' to the west of the east end of Runway 23/05; and 1,500' southwest of the northeast end of Runway 20/02.

The MSBLS was a Ku-band precision approach and landing navigational aid that provided slant range, azimuth, and elevation data to the orbiter from approximately 18,000' altitude, 15-nautical miles range, through touchdown. One of the units housed equipment for monitoring elevation and one for azimuth and distance; this information was broadcast by a rapidly oscillating antenna. Equipment onboard the orbiter received the data from the Microwave Scanning Beam Landing Ground Stations and automatically made any needed adjustments to glide slope.

The Microwave Scanning Beam Landing Ground Stations were prefabricated units featuring air conditioning units on the east elevations; metal entrance doors on the south elevations; and metal vents on the north elevations. The exteriors were painted with a red and white checkerboard scheme to enhance visibility on the Alkali Flat. The majority of all the MSBLS equipment was removed in 2011.

One of three Windbirds monitored by the U.S. Army is located southeast of the Microwave Scanning Beam Landing Ground Station on Runway 17/35. Additional Windbirds were located at the south end of Runway 17/35 and the east end of Runway 23/05.

2. CONDITION OF FABRIC

When documented in March 2012, the Microwave Scanning Beam Landing Ground Stations had been abandoned for over six months, but were in fair condition. The interior equipment had been removed and the exteriors were 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.

B. CONSTRUCTION

The Microwave Scanning Beam Landing Ground Stations were prefabricated metal buildings on concrete pads.

C. MECHANICAL/OPERATION

The Microwave Scanning Beam Landing Ground Stations featured electricity to power interior lights, electronic navigational equipment, and wall-mounted Air Conditioning units.

PART III. SOURCES OF INFORMATION

A. ENGINEERING PLANS AND DRAWINGS

There are no known engineering plans or drawings of the Microwave Scanning Beam Landing Ground Stations.

B. EARLY VIEWS AND HISTORICAL DATA

Historic photographs and maps of the WSSH are very limited. A 2010 view of a Microwave Scanning Beam Landing Ground Station can be found on page 17 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.

Doyle Piland, WSMR Museum Archivist, September 2011.

Dennis G. Perrin, NASA Johnson Space Center, Houston, Texas, and
WSTF Facility Manager (1975-1989), June 2013.

D. BIBLIOGRAPHY

Andreoli, R.J. "White Sands Missile Range, Range-Wide
Environmental Impact Statement," 1998. Unpublished report
on file at WSMR, White Sands, New Mexico.

Bennett, Jeffrey, and Douglas Wilder. "Physical Resources
Foundation Report: White Sands National Monument. Natural
Resources Report," 2009. National Park Service,
Fort Collins, Colorado.

Bergenson, Paul. "Jack (John Knudson) Northrop." Published
online in 2003 at website
[http://www.bergen.org/AAST/Projects/Engineering_Graphics/E
G2000/flyingwing/history/jack.htm](http://www.bergen.org/AAST/Projects/Engineering_Graphics/E_G2000/flyingwing/history/jack.htm), accessed November 19,
2011.

Buchanan, David G., John P. Johnson and William A. Brenner.
"White Sands Missile Range: Doña Anna, Sierra, Socorro, &
Lincoln Counties, New Mexico." Historic American
Engineering Record, 1984. National Park Service,
Washington, DC.

Butowsky, Harry A. "White Sands Blockhouse and Gantry Crane."
National Register of Historic Places Nomination, 1984. On
file, National Park Service, Washington, DC.

Deming, Joan, and Patricia Slovinac. "Survey and Evaluation of
NASA-owned Historic Facilities and Properties in the
Context of the U.S. Space Shuttle Program: White Sands Test
Facility, Las Cruces, New Mexico," 2007. Archaeological
Consultants, Inc., Sarasota, Florida. Unpublished report
on file at NASA, Kennedy Space Center, Florida.

_____. "NASA-Wide Survey and Evaluation of Historic Facilities in the Context of the U.S. Space Shuttle Program: Roll-Up Report," 2008. Archaeological Consultants, Inc., Sarasota, Florida. Unpublished report on file at NASA, Kennedy Space Center, Florida.

Freeman, Paul. "Abandoned & Little-Known Airfields: Northrup Strip/White Sands Space Harbor, White Sands, New Mexico." Published online, 2008. Website [http://www.airfields-freeman.com/NM/Airfields NM Alamagordo.html](http://www.airfields-freeman.com/NM/Airfields%20Alamagordo.html), accessed September 23, 2011.

Goebel, Greg. "Unmanned Aerial Vehicles." Published online, 2011. Website <http://vectorsite.net/twuav.html>, accessed November 29, 2011.

Greenwood, Richard. "Trinity Site." National Register of Historic Places Nomination Form, 1975. On file, National Park Service.

Guttman, John. "John Northrop's XP-79B Jet Fighter." Aviation History. Published online, 1996. Website <http://www.historynet.com/jack-northrops-xp-79b-jet-fighter-jan-96-aviation-history-feature.htm>, accessed November 19, 2011.

Hanson, Chris "Xenon." "Delta Clipper DC-X Test Launch, White Sands Missile Range." Published online, 1993. Website <http://xenon.arcticus.com/delta-clipper-dc-x-test-launch-white-sands-missile-range-september-1993>, accessed November 19, 2011.

Heumann, A. *Comprehensive View of the Transporter*. Unpublished Manuscript. August 15, 2002, pp. 1-9. On file, Canister Rotation Facility.

Lerner, Preston. "Black Day at White Sands." *Air & Space Smithsonian Magazine*, August 2010.

McDonnell Douglass. "Delta Clipper Test Program Off to Flying Start." Press Release issued June 20, 1994.

Mitchell, Robert E. "NASA Johnson Space Center Facilities Oral History Project: Robert E. Mitchell, Interviewed by Jennifer Ross-Nazzal." Las Cruces, New Mexico, August 10, 2009.

NASA. "Space Shuttle Transoceanic Abort Landing (TAL) Sites." Information booklet published online, 2006. Website http://www.nasa.gov/centers/kennedy/pdf/167472main_TALsites-06.pdf, accessed November 19, 2011.

NASA White Sands Test Facility. "White Sands Space Harbor: 25th Anniversary Celebration, August 11, 2001." Unpublished brochure, on file at WSTF, White Sands, New Mexico.

_____. "White Sands Test Facility Visitors Guide." Information booklet published online, n.d. Website http://www.nasa.gov/centers/wstf/pdf/216491main_wstfVisGuide031008.pdf, accessed November 19, 2011.

Offutt, Frank. "WSSH Background." Unpublished response to questionnaire, 1994, submitted by Victoria Bradley, on file at WSTF, White Sands, New Mexico.

Paczynski, Alex S. "NASA Johnson Space Center Facilities Oral History Project: Alex S. Paczynski, Interviewed by Jennifer Ross-Nazzal." Las Cruces, New Mexico, August 10, 2009.

Stevens, Paul. "Desert Missile Range Prepared for Possible Space-Shuttle Landing: New Mexico strip chosen by NASA as alternate site." Associated Press News Release, March 26, 1981.

United States Air Force. "Holloman Air Force Base History." Holloman Air Force Base, New Mexico, Public Affairs Office. Published online, 2008. Website <http://www.holloman.af.mil/library/factsheets/factsheet.asp?id=4361>, accessed November 17, 2011.

United States Army. "Final Environmental Impact Statement for Development and Implementation of Range-Wide Mission and Major Capabilities at White Sands Missile Range, New Mexico: Volume 1, 2009. On file at WSMR, White Sands, New Mexico.

_____. "WSMR: Fact Sheet." Unpublished brochure, n.d. On file at WSMR, White Sands, New Mexico.

Welsh, Michael. "Dunes and Dreams: A History of White Sands National Monument. Administrative History: White Sands National Monument." National Park Service, Division of History, Intermountain Cultural Resources Center, Santa Fe, New Mexico, Professional Paper No. 55, 1995.

White Sands Missile Range. "White Sands Hall of Fame: Alex Paczynski." Published online, 2000. Website <http://www.army.mil/PAO/WSHist/HallFame/Pages/PaczynskiAlexMr.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

¹ Reed, Mary Beth, and Robbie D. Jones. "Historic Architecture Survey and National Register of Historic Places Evaluation of the NASA White Sands Space Harbor on the U.S. Army Whites Sands Missile Range, Doña Ana County, New Mexico." New South Associates, Stone Mountain, Georgia, 1998: 44-62. Unpublished report on file at NASA WSTF, Las Cruces, New Mexico.

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.

WHITE SANDS SPACE HARBOR AREA 1, MICROWAVE SCANNING BEAM LANDING
GROUND STATIONS
HAER No. NM-28-P
(Page 14)

APPENDIX- LOCATION MAPS AND HISTORICAL VIEWS

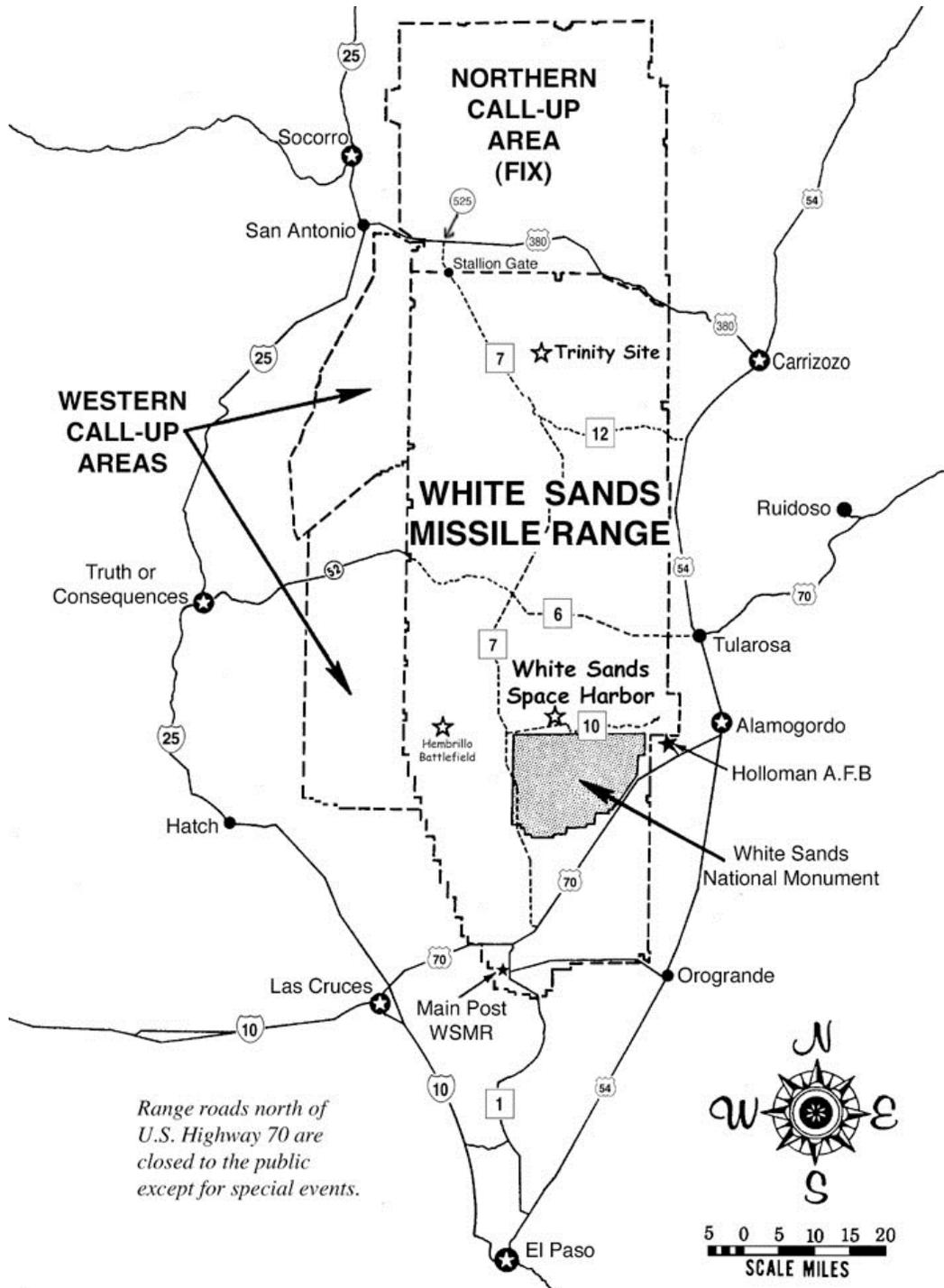


Figure 1. Map of White Sands Military Reservation showing White Sands Space Harbor (Source: U.S. Army).

WHITE SANDS SPACE HARBOR AREA 1, MICROWAVE SCANNING BEAM LANDING
GROUND STATIONS
HAER No. NM-28-P
(Page 16)

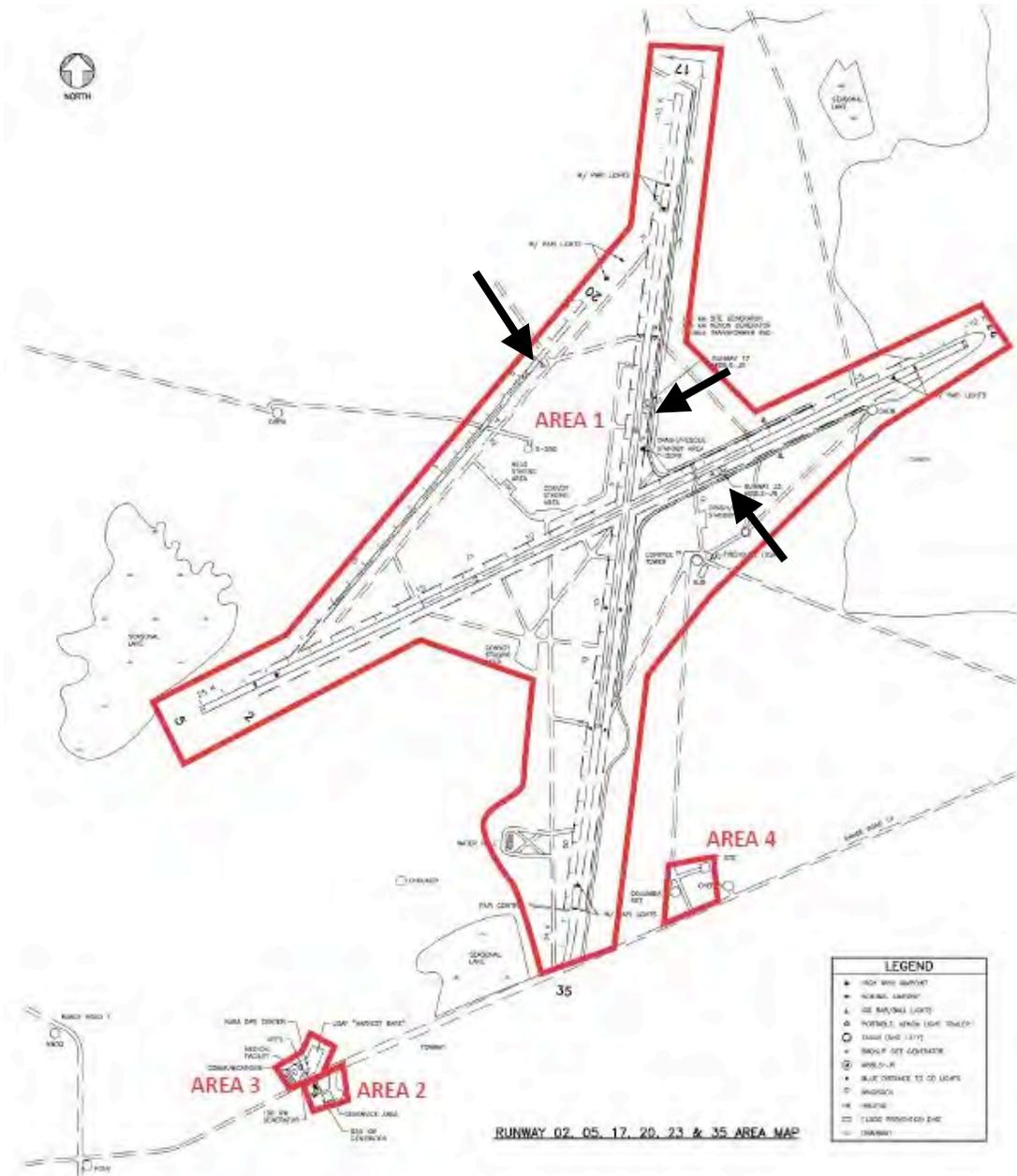


Figure 2. Map of WSSH showing location of the Microwave Scanning Beam Landing Ground Stations in Area 1, which delineates the NRHP boundaries of the WSSH Shuttle Landing Facility District (Base Map Source: NASA WSTF).



Figure 3. View of Microwave Scanning Beam Landing System Ground Station and Xenon Light Trailer at north end of Runway 17/35, looking northwest, during training exercise in 2010 (Source: NASA WSTF).

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

WHITE SANDS SPACE HARBOR AREA 1, HAER No. NM-28-P
MICROWAVE SCANNING BEAM LANDING GROUND STATIONS
(Space Shuttle Landing Facility Area 1, Microwave Scanning Beam
Landing Ground Stations)
White Sands Missile Range
1,500' to the south of the north end of Runway 17/35; 1,500' to the
west of the east end of Runway 23/05; and 1,500' southwest of the
northeast end of Runway 20/02.
White Sands vicinity
Doña Ana County
New Mexico

David Diener, Photographer

March 27-29, 2012

NM-28-P-1 VIEW OF TYPICAL MICROWAVE SCANNING BEAM LANDING SYSTEM
GROUND STATION, LOOKING NORTH ON EAST SIDE OF
RUNWAY 17/35 APPROXIMATELY 1-MILE NORTH OF THE
INTERSECTION WITH RUNWAY 23/05.

NM-28-P-2 VIEW OF WSMR WINDBIRD AT MICROWAVE SCANNING BEAM
LANDING SYSTEM GROUND STATION, LOOKING SOUTHEAST ON
EAST SIDE OF RUNWAY 17/35 APPROXIMATELY 1-MILE NORTH
OF THE INTERSECTION WITH RUNWAY 23/05.

WHITE SANDS SPACE HARBOR AREA 1, MICROWAVE SCANNING BEAM LANDING
 GROUND STATIONS
 HAER No. NM-28-P
 INDEX TO PHOTOGRAPHS
 PAGE 2

