KA'ENA POINT SATELLITE TRACKING STATION, BUILDING 35
(Satellite Control Station)
Ka'ena Point, Wai'anae Mountains above Keawaula Bay
Waialua
Honolulu County
Hawaii

HAER HI-97-E
HAER HI-97-E

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

KA‘ENA POINT SATELLITE TRACKING STATION
BUILDING NO. 35
(Satellite Control Station)

Location: Ka‘ena Point, Wai‘anae Mountains above Keawaula Bay
Waialua, Honolulu County, Hawai‘i

United States Geological Survey (USGS) Ka`ena Point,
Hawaii Quadrangle,
Universal Transverse Mercator Coordinates
Building 35: 2385334.02 m N, 576326.56 m E

Present Owner: Headquarters, Air Force Space Command
150 Vandenberg Street, Suite 1105
Peterson Air Force Base, CO 80914

Present Occupant: United States Air Force
Detachment 3, 21st Space Operations Squadron
50th Space Wing
P.O. Box 868
Waianae, Hawai‘i 96792-0868

Present Use: Satellite Tracking Station

Significance: Ka‘ena Point Satellite Tracking Station (KPSTS) is a radio receiving and transmitting facility that occupies approximately 153 acres of land leased from the State of Hawai`i, including easements and rights-of-way. KPSTS was originally established in 1958 to support the CORONA/Discoverer Satellite Program.

The CORONA/Discoverer Program was a covert surveillance and satellite reconnaissance program run by the United States (U.S.) in the 1950s and 1960s that was instrumental in the development of radar and surveillance technological advancements. The nation’s first satellite reconnaissance program was named Discoverer. Since the program was classified, it became known by its codeword CORONA although CORONA is not an acronym. The antenna equipment and support structures, and command stations, located within KPSTS, then known as “HULA,” supported the CORONA/Discoverer programs with data retrieval, tracking and relay; as well as gathering orbit and trajectory data to aid in the recovery of surveillance film capsules that were ejected from the satellites.

During the Cold War years when suspicions between the U.S. and the Soviet Union were high, concerns over the manufacture of nuclear weapons by the Union of Soviet Socialist Republics (U.S.S.R.) spurred the innovations in the U.S. reconnaissance missions. Space surveillance satellites captured photographs of suspect weapons storage and manufacturing locations within the Soviet Union at increasingly higher resolution throughout the duration of the CORONA/Discoverer program.[1] Global mapping and terrain imagery became an indispensable part of military intelligence. The last CORONA/Discoverer mission flight was in 1972.

Selected History Timeline of Events that Influenced the CORONA/Discoverer Program [2]

1946 First Post-war nuclear bombs explode in Operation Crossroads
1947 Central Intelligence Agency (CIA) established; Army separates from Air Force (AF)
1954 U-2 Program begins
1957 Soviets launch Sputnik I
1958 National Aeronautic Space Administration (NASA) established; Advanced Research Projects Agency (ARPA) est.; Air Force WS-117-L cancelled (and reconstituted as CORONA secretly)
1959 First series of “Special students” from Air Force Aeronautical Charting and Information Center (ACIC) arrive at Ohio State University (OSU); Army World Geodetic Datum (WGD59) finished
1960 First successful CORONA/Discoverer mission; Francis Gary Powers and U-2 shot down over Soviet Union; RACOMS Program begins
1961 Bay of Pigs invasion; TALENT-KEYHOLE security protocols formalized; National Reconnaissance Office (NRO) established
1962 Cuban Missile crisis; first successful CORONA-ARGON mission; first “Advanced” CORONA/Discoverer KH-4 mission
1965 Escalation of wars in Vietnam and Laos
1966 Secret Department of Defense (DOD) study suggests applications of classified reconnaissance information by nominally civilian federal agencies

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1 USNSSDC 1960: n.p. United States National Space Science Data Center, U. N., 20 August 1960. “Discoverer 14: NSSDC ID: 1960 -010A.” Accessed 21 January 2012. <http://nssdc.gsfc.nasa.gov/nmc/spacecraftDisplay.do?id=1960-010A>

2 Cloud 2002: 262. Cloud, J. “American Cartographic Transformations During the Cold War.” In *Cartography and Geographic Information Science*, Vol. 29, No. 3, pp. 261-282, 2002.

Selected History Timeline of Events that Influenced the CORONA/Discoverer Program (continued)

1966 U.S. Geological Survey (USGS) begins Building E-1 at new National Mapping Division (NMD) center in Virginia
1967 Six-Day War, Soviet invasion of Czechoslovakia, first CORONA/Discoverer KH-4B mission; Outer Space Treaty signed
1968 First color films flown in CORONA/Discoverer missions; Civilian Applications Committee (CAC) formed
1969 Strategic Arms Limitations Talks (SALT) begin in Finland; Apollo 11Astronauts reach the Moon; Military Geographic Information Systems (MGIS) Program begins
1971 First HEXAGON satellite reconnaissance mission
1972 Last CORONA/Discoverer Mission; SALT Treaty signed; World Geodetic System of 1972 (WGS72) completed; Most DOD and IC service-level mapping and geodesy service agencies consolidated into the Defense Mapping Agency (DMA)
1973 Office of Management and Budget Mapping Agency Task Force recommends consolidation
1975 Vietnam War ends
1978 President Carter publicly acknowledges the U.S. employs satellite reconnaissance
1992 NRO is officially recognized to exist; President Clinton elected
1995 Authorization for the declassification of CORONA; the CAC is acknowledged to exist

As a result of the contributions of the CORONA/Discoverer program, KPSTS is significant for its contributions to America’s history in the science and space exploration advances during the Cold War. KPSTS was a vital part of the U.S. military reconnaissance mission during the early development of our nation’s Satellite Command and Control Network.

PART I. ARCHITECTURAL STATEMENT

A. General Statement:

1. History: Building 35, also identified as a “Prelort” building or “Sat Con Station,” is a military vernacular building. It was designed by an unidentified engineering company for the Department of the Air Force, Space Systems Division, which was part of the Air Force Systems Command (AFSC), in Los Angeles in 1962 and constructed in the following year as a Satellite Control Facility for the CORONA/Discoverer Project.

By 1963, two antennas were operational atop Building 35; a Prelort (precision long-range tracking) radar unit for space vehicle tracking on the west end of the building, and a bi-helix satellite command (T&C) antenna on the east end of the building .[3] Each antenna had its own Control Room below and within the building;[4] these were presumably in Room 102 and Room 109.[5] These antennas also supported the Defense Meteorological Satellite Program (DMSP) and were protected by radomes which were installed after the building was constructed.[6] Both radome structures comprised an outer wall/skin of fiberglass composite hard plates that were bolted together.[7] In 1967 Burns and Roe, Inc. of Los Angeles, California was hired by AFSC to design and install fire protection for the building.[8]

In 1968, the prelort radar antenna was decommissioned and removed from the building.[9] In 1992, Hurricane Iniki caused irreparable damage to the radome on the west end of the building and it was not replaced.[10] Despite alterations, the building is significant for having had two radomes located on its roof. Tracking equipment computers in the interior are located in the same location as the original computer

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3 Smith, interview 24 July 2012. Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

4 Ibid. Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

5 Ibid. Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

6 Ibid. Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

7 Ibid. Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

8 Burns & Roes Inc., Drawing No. KP-2, AW 70-03-01, Sheet 3, 1967. Burns & Roe, Inc. “Satellite Control Facility Fire Protection Project, Ka`ena Point Satellite Tracking Station (AFSCF-KPSTS) Site Plan, Control Area, FPA Area & Existing Road B,” Drawing No. KP-2, AW 70-03-01, Sheet 3. Los Angeles, California, April 1967.

9 Smith, interview 19 April 2012. Smith, Milton R. Interview with Kathryn Ladoulis Urban. Written notes. 19 April 2012. Waianae, O`ahu.

10 Smith, interview 24 July 2012. Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

systems that were in operation in 1963.[11] The building represents typical Cold War satellite communications control rooms and how they functioned.

2. Architectural Character: The Satellite Control Station is a one-one-half-story building with multiple one-story additions, and a single-story penthouse addition. It has entrances that are located on all four facades. (See photographic documentation for HAER HI-97-E-01 through HAER HI-97-E-14).

B. Description of the Exterior:

1. Overall Dimensions: The building measures 24 feet – 0 inches in width and is 147 feet - 4 inches in length.

2. Foundations: The foundations are concrete with piers and footings which have been poured to a depth of 2 feet – 6 inches and support concrete masonry unit walls, four pairs of concrete pilasters, and 6 inch concrete floor slabs.

3. Wall Construction: The building's walls are of concrete masonry unit construction with a coating of exterior plaster. There are four pairs of reinforced concrete pilasters which support the roof slabs where two radomes were formerly located. The walls of one addition are constructed of concrete masonry units while one addition is of steel frame construction with an exterior finish of corrugated metal.

4. Structural System, Framing: The exterior walls of the building are reinforced concrete or 8" concrete masonry unit construction.

5. Porches: The building has entry vestibules and canopies which are located on the north and east facades, respectively.

6. Openings:

a. Doorways and Doors: Exterior doors are metal and of varying dimension.

b. Windows: There were originally six extruded aluminum windows which were located in the north and south facades but they have been either infilled or covered with metal lath and plaster.

7. Roof:

a. Shape and Covering: The building has a built-up roof on open web steel trusses and flat roof slabs where two radomes were previously located. The slabs are of indeterminate thickness and include circular concrete curbs which supported both the radomes and the antennae. A corrugated metal penthouse has

[11] Smith, interview 19 April 2012. Smith, Milton R. Interview with Kathryn Ladoulis Urban. Written notes. 19 April 2012. Waianae, O`ahu.

been constructed on the roof of the building and has a shed roof of standing seam metal with a slope of 1/8 inch per foot.

b. Cornice: The building has a flat parapet capped with metal flashing.

C. Description of the Interior:

1. Floor Plan: Entry is made from the building’s exterior into any one of five entrances. There is a corridor which extends the length of the building, provides access to six rooms and terminates in “prelort” and “verlort” rooms which are located at opposite ends of the building. Access to all but two rooms is restricted.

2. Flooring: The floor finish in the hall is low pile carpet, the restroom is ceramic tile, and the “prelort,” “verlort,” and “data” rooms have floors which are raised 1 foot – 2 inches above 6 inch concrete floor slabs. Restricted room floor finishes are unknown.

3. Wall Finishes: Interior wall finishes include exposed concrete masonry unit that has been painted.

4. Doorways and Doors: Interior doors are metal throughout.

5. Light Fixtures: Light fixtures are mid- late twentieth century fixtures throughout.

6. Heating: Constant temperature, humidity, and air pressure is provided by mechanical systems which have been upgraded since the building’s initial construction.

PART II. SOURCES OF INFORMATION:

A. Original Architectural/Engineering Drawings:

Burns & Roe, Inc. “Satellite Control Facility Fire Protection Project, Ka`ena Point Satellite Tracking Station (AFSCF-KPSTS) Site Plan, Control Area, FPA Area & Existing Road B,” Drawing No. KP-2, AW 70-03-01, Sheet 3. Los Angeles, California, April 1967.

Louie, Paul & Associates. “[Building 35] Site Plan, Fence Detail,” Drawing No. 04-14-92, Sheet A-1. Honolulu, Hawaii, April 1992.

_____. “Floor Plan, Reflected Ceiling Plan, Roof/Penthouse, Interior Elevations,” Drawing No. 04-14-92, Sheet A-2.

_____. “Exterior Elevations, Wall Sections,” Drawing No. 04-14-92, Sheet A-3.

_____. “Foundation Plan, Building. Sections, Penthouse Roof Framing Plan,” Drawing No. 04-14-92, Sheet A-4.

Norman Engineering Company. “[Building 35, Penthouse,] Architectural [and] Structural Sections & Elevations,” As-Built AW-30-05-05, Drawing No. A-2, Los Angeles, California, 30 August 1967.

B. Interviews:

Smith, Milton R. Interview with Kathryn Ladoulis Urban. Written notes. 19 April 2012. Waianae, O`ahu.

Smith, Milton R. Interview with KPSTS Environmental staff. Written notes. 24 July 2012. Waianae, O`ahu.

PART III. BIBLIOGRAPHY

Cloud, J. “American Cartographic Transformations During the Cold War.” In *Cartography and Geographic Information Science*, Vol. 29, No. 3, pp. 261-282, 2002.

United States National Space Science Data Center, U. N., 20 August 1960. “Discoverer 14: NSSDC ID: 1960 -010A.” Accessed 21 January 2012. <http://nssdc.gsfc.nasa.gov/nmc/spacecraftDisplay.do?id=1960-010A>

PART IV. HISTORIANS

Historical research was conducted and the historical narrative was prepared by Kathryn Ladoulis Urban, AIA, K Design Group, Honolulu, while the architectural descriptions were prepared by Stanley Solamillo, also of K Design Group, and completed on July 16, 2012.

PART V. PROJECT INFORMATION

This Historic American Engineering Record (HAER) recording project was undertaken and funded by the United States Air Force Center for Environmental Excellence, Department of Defense as part of an agreed mitigation with the Architecture Branch, State Historic Preservation Division (SHPD) of the Hawai‘i Department of Land and Natural Resources. The recording team consisted of preservation architect Kathryn Ladoulis Urban, AIA, architectural historian Stanley Solamillo, as well as architectural photographers Steve Brinkman and Tony Martie.

Research for this project was conducted at the University of Hawai‘i Government Documents collection; the Joint Base Pearl Harbor Hickam 15 Airlift Wing Base historian office archive collection, at KPSTS Administration Building 10 archive drawing collection; the National Electronics Museum archives in Linthicum Heights, Maryland; the University of Notre Dame Hersburgh Library, South Bend, Indiana, in the General collection and Government documents collection; the Declassified Files section of the National Reconnaissance Office; as well as on-line sources from December 2, 2011 through July 12, 2012.

Initial site visits were performed from December 13 through 15, 2011 at KPSTS. A two day site visit and photographic fieldwork for HAER documentation as well as photography of archival construction and as-built drawings of KPSTS buildings No. 11, 35, 39005, and 39006 was performed from April 18-19, 2012. Additional HAER photography of existing measured drawings was performed on June 28, 2012.