

HISTORIC AMERICAN ENGINEERING RECORD

CAPE CANAVERAL AIR FORCE STATION, LAUNCH COMPLEX 34 OPERATIONS SUPPORT BUILDING (Launch Complex 34, Engineering Support Building) HAER No. FL-8-AN

Location: Freedom Road, southwest of Launch Stand CX 34
Cape Canaveral Air Force Station
Brevard County
Florida

U.S.G.S. 7.5. minute False Cape, Florida, quadrangle,
Universal Transverse Mercatur coordinates:
17.542711.3154492

Date of Construction: 1961

Architect: Maurice H. Connell and Associates, Miami, Florida

Builder: unknown

Present Owner: National Aeronautics and Space Administration (NASA)
Kennedy Space Center, FL 32899-0001

Present Use: Vacant-Aerospace facility

Significance: The Operations Support Building (OSB) is located in the Launch Complex (LC) 34 Area of the Cape Canaveral Air Force Station (CCAFS). This one-story, 30,506 square foot (ft²) facility, built in 1961, provided laboratory facilities for measurement and calibration of telemetry and ground support equipment, network checkout, missile component checkout and evaluation, and pre-launch test and post-launch data review and evaluation in direct support of launch operations during the Apollo Program. At the conclusion of the Apollo program, the OSB remained a NASA asset, although many of the other structures within LC 34 were transferred back to the U.S. Air Force. At the time of photography, the building stood vacant. It is considered a contributing element to the CCAFS National Historic Landmark.

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Date: September 2007

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 2

Historical Information

In 1949, President Harry S. Truman signed legislation to establish the Joint Long Range Proving Ground at Cape Canaveral, Florida with Patrick Air Force Base (originally the Banana River Naval Air Station) selected as the support base. Between April and June of 1950, land was acquired at the Cape through negotiation and condemnation proceedings, and the U.S. Army Corps of Engineers was designated as the construction agency. The earliest launch pads, used for firing experimental winged missiles including the Lark, Matador, Snark, Bomarc, Bull Goose, and Mace, were located at the eastern tip of the Cape, and included Launch Complexes (LC) 1 and 2, 3 and 4, 9 and 10, and 21 and 22 (see Appendix A).

The constant drive to develop more accurate and powerful weapons during the Cold War led to the construction of additional launch complexes along the Cape. Between 1955 and 1968, Launch Complexes 5 and 6, 17, 18, 25, 26, 29, and 30 were built at the south area of the Cape for launching intermediate-range ballistic missiles (IRBM), including the Redstone, Pershing, Polaris/Poseidon, and Thor. To the north along the Cape, Launch Complexes 11, 12, 13, 14, 15, 16, 19, 20, 34, 36, and 37 were built between 1957 and 1963 for launching intercontinental ballistic missiles (ICBM), such as the Atlas and Titan, and space launch vehicles including the Juno and Saturn.¹ LC 34 and LC 37 were specifically developed for the Saturn missile.

Planning and development of the Saturn missile, and the construction of LC 34, originated prior to the creation of the Apollo program. Following the launch of Sputnik I and Sputnik II, which placed Soviet satellites into Earth's orbit in 1957, the attention of the American public turned to space exploration. President Dwight D. Eisenhower initially assigned responsibility for the U.S. Space Program to the Department of Defense (DoD). The Development Operations Division of the Army Ballistic Missile Agency (ABMA), led by Dr. Wernher von Braun, began to focus on the use of missiles to propel payloads, or even a man, into space. The United States successfully entered the space race with the launch of the Army's scientific satellite Explorer I on January 31, 1958 using a modified Jupiter missile named Juno I.²

¹ David Barton and Richard S. Levy, *An Architectural and Engineering Survey and Evaluation of Facilities at Cape Canaveral Air Force Station, Brevard County, Florida* (Resource Analysts, Inc., 16 March 1984), 4 and 9; Denise P. Messick, Cynthia G. Rhodes, and Charles E. Cantley, *45th Space Wing Cultural Resource Management Plan*, Technical Report No. 386 (Stone Mountain, Georgia: New South Associates, 1996), 95; James N. Gibson, *Nuclear Weapons of the United States: An Illustrated History* (Atglen, PA: Schiffer Publishing, Ltd., 2000); Hartmann, Al, volunteer, Air Force Space and Missile Museum. Interview by Kimberly Hinder, 30 April, 27 May, and 16 June 2003, CCAFS.

² Charles D. Benson and William B. Faherty, *Moonport: A History of Apollo Launch Facilities and Operations* (National Aeronautics and Space Administration, Scientific and Technical Information Office, 1978); reprint as *Gateway to the Moon: Building the Kennedy Space Center Launch Complex and Moon Launch! A History of the Saturn-Apollo Launch Operations*, (Gainesville: University Press of Florida, 2001), 1-2.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 3

The Saturn family of rockets originated as part of the Juno missile program in 1957. Originally designated as Juno V, initial designs called for a rocket with a first stage composed of a cluster of eight Redstone missile stages surrounding one Jupiter missile stage. This pioneering design was the first to increase a rocket's payload capacity by clustering existing missiles. In August 1958, the Advanced Research Projects Agency (ARPA), a division of the DoD, officially authorized ABMA to proceed with the development of the Juno V. In October 1958, von Braun recommended renaming the Juno V because the rocket was markedly different from the Jupiter-based Juno family of rockets. He suggested the name of Saturn since the planet is the sixth from the sun following Jupiter, a name ARPA approved in February 1959.³

With the realization that the military's involvement in the space program could jeopardize the use of space for peaceful purposes, President Eisenhower established the National Aeronautics and Space Administration (NASA) on October 1, 1958 as a civilian agency with the mission of carrying out scientific aeronautical and space exploration, both manned and unmanned. NASA soon organized a National Launch Vehicle Program to identify and analyze which missiles would be the most effective for exploring space. Although still under development, the potential power of the clustered rocket design of the Saturn led to its selection as one of the core boosters for space launch vehicles.⁴ Initially working with NASA as part of a cooperative agreement, President Eisenhower officially transferred to NASA a large portion of the Army's Development Operations Division, including the group of scientists led by von Braun and the Saturn rocket program.⁵

Shortly after the establishment of NASA, the Saturn Vehicle Evaluation Committee, composed of representatives from the Air Force, NASA, ARPA, and ABMA, met in order to determine the configuration and goals for the Saturn missile. Commonly known as the Silverstein Committee,⁶ the group selected three initial missions for the Saturn vehicle: unmanned lunar and deep space missions with a 9,920 pound escape payload, a 24-hour equatorial orbit with a 4,960 pound payload, and manned spacecraft missions in low orbit. To achieve these goals, the committee

³ Clifford J. Lethbridge, "Saturn I Fact Sheet," Spaceline.org, Spaceline, Inc., 1998.

⁴ R. Cargill Hall, "Civil-Military Relations in America's Early Space Program." In *The U.S. Air Force in Space: 1945 to the 21st Century*, Proceedings Air Force Historical Foundation Symposium, Andrews AFB, Maryland, September 21-22, 1995, ed. R. Cargill Hall and Jacob Neufeld, 18-31, (Washington, D.C.: USAF History and Museums Program, United States Air Force, 1998), 30; Barton and Levy, 20-27; David N. Spires, "The Air Force and Military Space Missions: The Critical Years, 1957-1961." in the *U.S. Air Force in Space: 1945 to the 21st Century*, Proceedings of the Air Force Historical Foundation Symposium, Andrews AFB, Maryland, September 21-22 1995, ed. R. Cargill Hall and Jacob Neufeld, (Washington D.C.: USAF History and Museums Program, United States Air Force, 1998). 39.

⁵ Benson and Faherty, 15; Spires, 39.

⁶ Dr. Abe Silverstein, NASA's Director of Space Flight Development, led the committee. John L. Sloop, *Liquid Hydrogen as a Propulsion Fuel, 1945-1959, The NASA History Series*, (Washington D.C.: National Aeronautics and Space Administration, 1978).

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 4

recommended that NASA consider three different Saturn configurations, utilizing the clustered first stage concept mated with several different upper stages. Of the three suggested configurations, known as Saturn A, Saturn B and Saturn C, the Saturn C was selected. The configuration included five versions of the missile, Saturn C-1 through Saturn C-5, ranging from the least to the most powerful. The Saturn C-1, which consisted of a two-stage vehicle that closely resembled the original Juno V plans, was already under development. The Saturn C-2, would utilize the same first stage with an improved second stage and an added third stage. The Saturn C-3, C-4, and C-5 would be based upon the C-2 configuration, but would employ varying numbers of more powerful Rocketdyne engines in the first stage. NASA selected the two-stage Saturn C-1 for Apollo research and development flights. Assembled by Chrysler, who had also produced Redstone and Jupiter, the missile was ready for flight tests by 1961.⁷

Following the approval of the development of the rocket in 1958, the Air Force and NASA evaluated whether to use an existing or new site at the Cape for launching the new Saturn missile. The size and explosive power of the Saturn required the construction of a new launch complex at Cape Canaveral. At the time LC 34 was conceived, only four test flights of the Saturn vehicle were planned and there was no timetable requiring a rapid series of launches. With no strong argument to justify the cost of a second launch pad, a single launch pad was constructed at Complex 34. As a result, the maximum launch rate for the complex was four vehicles per year, allowing one month for pad refurbishment between launches and two months for vehicle checkout.⁸

In May 1961, President John F. Kennedy charged NASA and the associated industries to develop a space program that would surpass the Soviet program by landing a man on the moon by the end of the decade. With widespread support, the space program proceeded rapidly. In order to streamline and accelerate the program, NASA discontinued development of the Saturn C-2, C-3, and C-4, instead focusing on plans for the C-1, the uprated C-1 (also known as the IB), and the C-5. In February 1963, the "C" designation was dropped from the Saturn names, leaving simply the Saturn I, Saturn IB, and Saturn V.⁹

Following the successful first test flight of the Saturn I in October 1961, NASA announced that the family of Saturn vehicles would be the launch vehicles used in the Manned Lunar Landing Program (Apollo). Three more test flights of the Saturn C-1 followed in April and November 1962 and March 1963, all from Launch Complex 34. All four flights of the Saturn I were launched in the Block I configuration which consisted of a live first stage topped by a dummy

⁷ Benson and Faherty, 13-15; Lethbridge, "Saturn I Fact Sheet."

⁸ Kennedy Space Center, "Launch Complex 34 Facilities, Fact Sheet 05," July 1966, Historical Archives, John F. Kennedy Space Center, 1.

⁹ Benson and Faherty, 37, 60-64; Barton and Levy, 30-31; Lethbridge, "Saturn I Fact Sheet"; Cleary, Eastern Range Launches.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 5

upper stage composed of an inert Jupiter missile shell ballasted with water to provide aerodynamic stability. The live first stage consisted of eight Redstone missile stages, which acted as fuel tanks, surrounding one Jupiter missile stage, similar to the original design for the Juno V. The Block I configuration was utilized to test the vehicle's compatibility with the launch facility, flight dynamics of the vehicle, and the reliability of the clustered first stage.

Following the successful test flights of the Saturn I, Block I at LC 34, NASA initiated testing of the Saturn I, Block II configuration which featured operational first and second stages, allowing for larger payloads. The second stage of the Block II configuration consisted of a Pratt and Whitney engine powered by a combination of liquid oxygen and liquid hydrogen. When initial evaluations in late 1959 indicated that an explosion of the Block II would render Complex 34 unusable for a year, NASA initiated the construction of a second Saturn launch complex, LC 37. Completed by January 1963, NASA conducted six test flights of the Block II configuration from the complex between January 1964 and July 1965.¹⁰

Parallel development of the Saturn V rocket, with the increased power necessary to propel man to the moon, led to new blast and acoustic hazards. With these factors in mind, combined with the stepped-up launch schedule to complete the Apollo goals set by President Kennedy, it was apparent by 1961 that the Saturn V required a new launch complex. Cape Canaveral, with over twenty-two launch complexes, did not have room for another. Starting in 1962, NASA officials solved the dilemma by acquiring land on Merritt Island, west and north of the existing missile launching area at the Cape, to construct Launch Complex 39. Placed under NASA's exclusive jurisdiction, the installation was initially known as the Merritt Island Launch Area. It was renamed the John F. Kennedy Space Center (KSC) in November 1963 following the death of the president.¹¹ The first test launch of a Saturn V occurred from the newly completed Launch Complex 39 at the KSC on November 9, 1967.¹²

After the final test flight of the Block I configuration in March 1963, the facilities at Complex 34 were modified for the assembly, checkout, and launch of the larger, more powerful Saturn IB while NASA initiated testing of the Block II configuration at Complex 37. The Air Force approved the initial modifications to LC 34, prior to its official transfer to NASA in November 1963. The Saturn IB incorporated an uprated Saturn I first stage mated to a new second stage. Scientists reduced the weight of the eight Rocketdyne H-1 engines in the first stage while

¹⁰ Benson and Faherty, 30; Lethbridge, "Saturn I Fact Sheet"; Cleary, "45th Space Wing: Its Heritage, History & Honors 1950-2001, Launch Facilities & Programs: Complexes 34 and 37"; Clifford Lethbridge, "Cape Canaveral Rocket and Missile Box Scores," Spaceline.org, Spaceline, Inc., 2001; Clifford Lethbridge, "Cape Canaveral Launch Site Box Scores," Spaceline.org, Spaceline, Inc., 2001.

¹¹ Benson and Faherty, 65-68, 96-98, 105, 133-137, 146-48.

¹² Barton and Levy, 31; Butowsky, "Man in Space," 5-6; Clifford J. Lethbridge, "Saturn V (Apollo) Fact Sheet," Spaceline.org, Spaceline, Inc., 1998.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 6

improving their thrust. Designed to support manned space flight, the second stage was composed of a Rocketdyne J-2 engine which burned a combination of liquid oxygen and liquid hydrogen.

The first test flight of the Saturn IB was launched from LC 34 on February 26, 1966. Two more unmanned test flights followed, one from LC 34 and one from LC 37. The fourth scheduled flight was to be the first manned mission, scheduled to launch from LC 34 in February 1967. However, during a countdown simulation, three astronauts, Virgil "Gus" Grissom, Edward White, and Roger Chaffee, lost their lives in an oxygen fire in the cockpit on January 27, 1967, an event later commemorated as Apollo 1.

Following the fire, and subsequent modifications to the spacecraft, three unmanned Earth orbital missions occurred to continue testing of the Saturn rocket and the Command and Service modules: Apollo 4 in November 1967, Apollo 5 in January 1968, and Apollo 6 in April 1968.¹³ The October 11, 1968 Apollo 7 launch was the first manned Apollo launch which placed astronauts into Earth's orbit for a ten-day mission. Essentially a test flight, the crew, Walter Schirra, Donn Eisele, and Walter Cunningham, tested the Command Service Module and its guidance and control systems, the Instrument Unit, the Spacecraft Lunar Adapter, spacesuit design, food supplies and work routines. During the flight the astronauts separated the Command Service Module from the second stage in order to practice rendezvous operations with the booster. Seven television transmissions from the spacecraft were broadcast on live television in the United States and overseas. Apollo 7 was the final launch from Complex 34.¹⁴

Development of Launch Complex 34

As the first of three launch complexes constructed at Cape Canaveral and KSC to serve the Apollo program, LC 34 played a significant role in the development of the Saturn missile necessary to achieve the program's goals. The successful completion of the Apollo program brought an end to the fears that the United States was losing not only an "arms race," but also a "space race," with the Soviets. From 1961 to 1968, NASA launched seven space launch vehicles from LC 34, including all four of the Saturn I Block I test flights, two tests of the Saturn IB, and the launch of Apollo 7, the first manned orbital flight of the program. Significantly, LC 34 was the largest rocket launching site in the world, and the first built expressly for the peaceful exploration of space.¹⁵ The Complex was also the site of the first NASA tragedy, with the loss of Apollo 1 and its crew on the pad in January 1967.

¹³ Apollo 4 and Apollo 6 launched from LC 39A; Apollo 5 launched from LC 37B. Lethbridge, "Saturn I Fact Sheet"; Cleary, "Complexes 34 and 37"; Lethbridge, "Cape Canaveral Rocket and Missile Box Scores"; Lethbridge, "Cape Canaveral Launch Site Box Scores"; Barton and Levy, 31; Butowsky, "Man in Space," 5-6.

¹⁴ Clifford J. Lethbridge, "Apollo 7 Fact Sheet," Spaceline.org, Spaceline, Inc., 2001.

¹⁵ Kennedy Space Center, 1966, 2.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 7

LC 34 was constructed between June 1959 and June 1961. As the construction agency for Cape Canaveral, the U.S. Army Corps of Engineers let the contract for the construction of LC 34 on June 3, 1959, which started five days later on June 8. Plans for the complex were prepared by Maurice H. Connell and Associates, Inc. and Rader and Associates. Construction was completed in July 1961 and officially approved by the Corps in January 1962. The initial construction costs for the "brick and mortar" totaled \$6,215,000; by 1966, the complex was valued at \$25,340,000. The first launch of a Saturn I missile occurred at LC 34 on October 27, 1961, producing the largest thrust of a United States launch vehicle up to that time.¹⁶

Following the last Saturn I Block I test, in 1963, LC 34 underwent a series of modifications to support the advanced configuration of the Saturn IB, which continued through 1964 and into 1965.¹⁷ Rehabilitation efforts included alterations and upgrades to the RP-1 and liquid oxygen fueling systems. The gaseous nitrogen and helium batteries at the High Pressure Gas Facility were subsequently replenished from the central converter-compressor facility designed to service both Launch Complexes 34 and 37. A new High Pressure Gas Battery, a Liquid Hydrogen Facility, a High Pressure Gaseous Hydrogen Storage Battery and Burn Stack, an Administration Office, a new Sentry House, and a Theodolite Building were installed at the complex. In addition, the Mobile Service Structure and the Umbilical Tower were modified.¹⁸

Following the October 1968 launch of Apollo 7, LC 34 was reduced from an operationally ready state to a downmoded configuration, and a Phaseout Plan was approved in April 1971.¹⁹ The Complex was mothballed in November 1971, and the Mobile Service Structure and Umbilical Tower were razed in April 1972 due to excessive rust and deterioration. LC 34 was officially abandoned in October 1973 with most of the facilities transferred back to the Air Force's control in November 1973. Many of the structures were removed from the real property records, demolished, or moved to other complexes.²⁰ NASA retained control of the Operations Support Building and the Blockhouse, the latter of which served as a site for NASA tour stops until it was

¹⁶ Real Property Cards, Cape Canaveral Air Force Station; Eastern Test Range Launch Complexes, 1991; Cleary, Eastern Range Launches; Cleary, "45th Space Wing"; "LC-34/37 Phaseout Plan," Prologue; Maurice H. Connell & Associates, Inc., *Air Force Missile Test Center, Complex*, Location & Vicinity Maps and Index to Drawings, 01-21900-081, 01-21900-047, 01-21900-048, 01-21900-049, 01-21900-050, 01-21900-051, 01-21900-086, 01-21900-100, 01-21900-101, U-34-A1, and U-34-A2; Rader and Associates, *Air Force Missile Test Center, Complex*, Drawings 01-21900-003, 01-21900-004, 01-21900-005; *Technical Facilities Catalog: Volume II, 10-10*.

¹⁷ Kennedy Space Center, 1966, 2.

¹⁸ United States Air Force, Property Cards 01-21900, 21950, and 21915, Launch Complex 34 files.

¹⁹ "LC-34/37 Phaseout Plan," Prologue.

²⁰ United States Air Force, Property Cards 01-21900 and 21950, Launch Complex 34 files; United States Air Force, Voucher Nos. 75-1006 and 75-1104.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 8

transferred back to the Air Force in 1986.²¹ Although most of the control panels and machinery have been removed from the Blockhouse, the building remains largely intact with the original periscopes and most of the original finishes in place. On April 16, 1984, Launch Complex 34 was listed as part of the discontinuous CCAFS National Historic Landmark District. In honor of the astronauts lost in Apollo 1 and the goals achieved at Launch Complex 34, a Historical Site Kiosk was erected on the Launch Pad in 1987.²²

Throughout the 1990s, several buildings, including the Phased Array Radar Pedestal, Van Shelter, Toilet, Septic Tank, Optical Tracker, Electrical Substation, Shop/Storage Building, Electrical Substation, and three Hazardous Waste Storage Sheds, were constructed around the complex.²³

Operations Support Building

The Operations Support Building (OSB), currently known as the Engineering Support Building (ESB), was designed by Maurice H. Connell and Associates of Miami, Florida in 1961.²⁴ The original concept for LC 34 had included a Staging Building, which would receive, inspect, and, if necessary, repair the Saturn stages prior to their final assembly at the pad. Subsequent blast studies, however, revealed that the Staging Building, as designed, would not withstand a potential explosion and therefore, needed to be relocated.²⁵ Because the facility also incorporated engineering, shop, and laboratory spaces necessary for the pad operations, an alternate location for these services had to be chosen. The only planned facility large enough, and sturdy enough, was the launch control blockhouse, but it was deemed unreasonable to place the work areas there, thus the necessity for the OSB.²⁶ Cost estimates for the OSB ranged from \$600,000 to \$870,000, typical of the blast resistant construction the facility needed, since it was 703 feet from the launch pad, and would be occupied during a launch.²⁷

²¹ Master Planning, *CCAFS Basic Information Guide*; Cleary, "Launch Facilities & Programs: Complexes 34 and 37"; United States Air Force, Property Cards 01-21900 and 21934, Launch Complex 34 files; Butowsky, National Register Nomination, Section 7, pg. 17.

²² United States Air Force, Launch Complex 34 files, Property Cards 21801.

²³ Master Planning, *CCAFS Basic Information Guide*; United States Air Force, Launch Complex 34 files, Property Cards 01-21900, 22003, 22004, 22005, 22006, 22007, 22008, 22010, and 26005.

²⁴ Maurice H. Connell and Associates, Inc., Miami, "Complex 34 Operations Support Building," June 1961, Engineering Documentation Center, John F. Kennedy Space Center, Sheet 4 of 34.

²⁵ S. Snyder, Asst. Director, Launch Operations, "Operations Support Building – Complex No. 34 – Cape Canaveral, Florida," July 12, 1960, Historical Archives, John F. Kennedy Space Center.

²⁶ Snyder.

²⁷ Snyder; George C. Marshall Space Flight Center, Launch Operations Directorate, "Operations Support Building, Launch Complex 34," September 22, 1960, Historical Archives, John F. Kennedy Space Center; Army Ballistic Missile Agency, "Criteria for Design, VLF 34 Auxiliary Support Building, Atlantic Missile Range, Station Number One, Cape Canaveral, Florida," April 11, 1960, Historical Archives, John F. Kennedy Space Center.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 9

Initial plans called for approximately 140 employees in the facility, composed mainly of personnel from Marshall Space Flight Center's Launch Operations Directorate (LOD) and contractors for the Saturn's upper stages.²⁸ The architectural plans (Photo 31), following criteria set by ABMA, provided specific rooms for the different functions. Aside from office and conference rooms, there was one room each for the Saturn 2nd and 3rd stages, one documentation room each for Chrysler and IBM, various other equipment rooms for each contractor, and a Ground Service Equipment (GSE) shop.²⁹ The Chrysler Corporation's Space Division manufactured the Saturn IB stage at the Michoud Assembly Facility in Louisiana; IBM's Federal Systems Division was selected by NASA in 1963 to develop and building the instrument units (IU) for the Saturn IB and Saturn V launch vehicles. The IUs were produced at IBM's facility in Huntsville, Alabama.³⁰ In reality, the OSB was used as a general shop and engineering activities area. The Launch Complex 34 Facilities Fact Sheet reported that the facility had "...space for measuring and calibrating telemetry and ground support equipment, for electrical networks, and for checkout and evaluation of components. In addition, space is provided for critical parts storage, mechanical equipment, and personnel work areas."³¹ During the Apollo manned space program, rocket engine parts, placed on storage racks located along the northwestern side of the building, were cleaned with trichloroethylene (TCE), a degreasing solvent.

In May 1963, after the final Saturn I Block I launch at LC 34, the LOD and KSC's Launch Operations Center were reorganized and the Launch Vehicle Operations (LVO) division was established. During the Saturn IB and Apollo 7 launches at LC 34, this group used the OSB as their center of operations.³² Following the abandonment of LC 34 in October 1973, NASA retained control of the OSB. Between that time and December 1998, the building was used for records storage. Since 1998, it has been abandoned in place, and used for the storage of remediation equipment. It is considered a contributing element to the CCAFS National Historic Landmark District.³³

²⁸ George C. Marshall Space Flight Center, Launch Operations Directorate.

²⁹ Maurice H. Connell and Associates, Inc., Sheet 4 of 34; Army Ballistic Missile Agency.

³⁰ "Saturn IB," <http://www.astronautix.com/lvs/saturnib.htm>

³¹ Kennedy Space Center, "Launch Complex 34 Facilities, Fact Sheet 05," July 1966, Historical Archives, John F. Kennedy Space Center, 8.

³² "Launch Vehicle Operations Has Varied Responsibilities." *Spaceport News* (2, 34) 22 August 1963: 4-5; "Headquarters Approves New LOC Organization." *Marshall Star* (3, 31) 1 May 1963: 1 and 8.

³³ Michael Deliz, Remediation Project Manager, John F. Kennedy Space Center. Interview by Patricia Slovinac, 23 April 2007, via phone. Notes from interview and e-mail. Archaeological Consultants, Inc., Sarasota

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 10

Physical Description

The OSB is a one-story, 29,962 ft² rectangular structure located to the southwest of Launch Pad 34. It is constructed of concrete block, has a flat, pan type construction roof with concrete girders and beams, and a poured concrete slab foundation. The OSB measures approximately 201' x 152' x 17.5'. The north elevation (Photo 1) contains one set of double doors, which leads to a personnel tunnel. The west elevation (Photo 3) has three rolling doors, one set of sliding doors, one pair of double swing doors for equipment, three sets of double swing doors for personnel, and three single swing doors. The south elevation (Photo 5) has one pair of double doors; the east elevation (Photo 7) is void of openings. Within the south area of the west side is a 4,175-ft² covered, external shed area. An electrical substation to the southwest and a septic tank to the northwest support this facility.

The internal layout of the original OSB is roughly based on a double-loaded corridor plan (Photo 31). The corridor takes the shape of the letter 'F', with the vertical stroke extending north to south, one room width from the east wall. The top horizontal stroke sits one room width from the south wall; the lower horizontal stroke is located at approximately the center of the building. The corridor is 7' wide in all three sections. The vertical section has a pair of double metal swing doors on the north exterior wall, and the two horizontal sections have a set of double metal swing doors at their west terminations. The north set of doors leads to a personnel tunnel, while the west sets of doors lead to the covered exterior shed area.

Extending along the east wall is a series of nine small labs, test rooms, and office areas. With the exception of Room 101 at the north end, all of the rooms measure approximately 25' x 20', with concrete block walls and acoustic tile ceilings. Each has a 3-foot wide wood swing door on their west wall, and pendant fluorescent light fixtures. Room 101 has an overall size of 25' x 20', but is divided into three rooms, one to the west (101) and two to the east (101A and 101B). Its main door is on the west wall, like the other rooms, and there is a door from the west room into the southern east room, which has a door on its north wall that provides access to the second east room. Like the other eight rooms, this area has concrete block walls and pendant fluorescent lights, but the ceiling is sprayed acoustical plaster.

A single line of four rooms extends along the length of the south wall. The eastern two rooms each measure roughly 25' x 20', with concrete block walls and acoustical tile ceilings with pendant fluorescent light fixtures. These two rooms served as the central office for the OSB. A set of double wood swing doors leads from the corridor into the western room, which then has a single wood swing door into the eastern room. To the west of this area are two rooms, each of which measures approximately 50' x 20'. Room 129, to the east, has concrete block walls, an acoustical tile ceiling, and pendant fluorescent light fixtures. There are two wood swing doors along its north wall, and a small partitioned space at its northwest corner. Room 136 (Photo 14),

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 11

to the west, also has concrete block walls, but the ceiling is open with surface mounted fluorescent light fixtures on the roof joists. There are two sets of double swing doors on its north wall.

Bordered by the two east-west sections of the corridor, the north-south section of the corridor and the west wall is a cluster of seven office and service rooms. There are two rooms along the north-south corridor. The north room measures approximately 18' x 43', and the south room measures roughly 18' x 23'. Both have concrete block walls, acoustical tile ceilings, and pendant fluorescent light fixtures. The north room (Photo 19) has a wood swing door on both its east and north walls. The south room has a wood swing door on its south wall. To the immediate west of these two rooms is an Evaluation and Conference room, which measures approximately 66' x 25' (Photo 18). This room has concrete block walls, an acoustical tile ceiling, pendant fluorescent light fixtures, and wall-mounted fluorescent fixtures along the east and west walls. There is a pair of wood swing doors on its north wall, and a single wood swing door on its south wall.

To the west of the conference area is a cluster of four rooms, including the Air Conditioning Mechanical Equipment room (Photos 28-30) and restroom facilities. The men's restroom sits at the north, and measures approximately 25' x 13', with a wood swing door on its north wall. At the south is the women's restroom and a second room, both of which measure roughly 12.5' x 13', and have a single wood swing door on their south wall. The A/C Mechanical Equipment room sits between these rooms, with approximate dimensions of 43' x 25'. It has a set of double doors on its west wall, which leads to the west shed area. To the west of the men's restroom is a locker room, which projects into the shed area. It measures approximately 25' x 33', and has a shower in its southeast corner. The locker room can be accessed from either the men's restroom or the shed area through a wood swing door or metal swing door, respectively. All five of these areas have concrete block walls and open ceilings, with fluorescent light fixtures mounted to the roof joists.

A second L-shaped cluster of ten rooms sits to the north. It is bordered by the central corridor, the north-south corridor, the north wall, and the west wall. The north three rooms form the Ground Support Equipment (GSE) area. Overall, it has dimensions of approximately 68' x 40'. The 50' x 40' GSE shop sits to the west (Photo 22), with the 18' x 20' GSE Valve and Instrument Checkout Lab to its northeast, and the 18' x 20' Surface Cleaning Lab to its southeast. All three spaces have concrete block walls and pendant fluorescent light fixtures. The GSE Shop and the Surface Cleaning Lab have acoustical plastered ceilings, whereas the Valve and Instrument Checkout Lab has an acoustical tile ceiling. The GSE Shop has a swing door on its west wall into the front bay area, a pair of swing doors and a single swing door on its south wall, which lead to a storage room and systems analysis room/corridor respectively, and a swing

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 12

door on its east wall that leads to the Valve and Instrument Checkout Lab. Between the Valve Lab and the Cleaning Lab is an airlock, with wood swing doors on its north and south walls.

Both the storage room and the roughly 27' x 20' Room 105, designated as the Chrysler Mechanical System Analysis Unit on the plan, located to the south of the GSE area, have concrete block walls and acoustical tile ceilings with pendant fluorescent light fixtures. The analysis room has two small work areas to the west, accessed by a wood swing door. In addition, there is a wood swing door on its east wall, which leads to the corridor. To the south of these two units are four rooms, one at the west, two in the center, and one at the east. All four spaces have concrete block walls, acoustical tile ceilings, and pendant fluorescent light fixtures. The west room, Room 116, measures approximately 40' x 25'. It has a pair of wood swing doors on its south wall and a metal rolling door on its west wall, which leads to the shed area. The central two rooms each measure about 20' x 25', and make up Room 112 (Photo 20). Movement through these two spaces is through a pair of bottom-louvered swing doors, and there is a pair of wood swing doors on the south wall into the corridor. The east room, Room 108, measures roughly 40' x 18', and has a single wood swing door on its south wall.

To the west of the GSE shop is a front bay area (Photos 23-27), which measures approximately 60' x 50'. Personnel access to this area is through a metal swing door on its east wall, shared with the GSE shop, and two metal swing doors on its west elevation. There are also equipment doors on the east (one metal rolling door) and west walls (two metal rolling doors and one pair of metal swing doors). To the south of this bay area are two storage rooms, each of which measures roughly 25' x 20'. The one to the west is accessed through the bay area by a metal swing door and from the exterior by a metal rolling door. The east storage room is accessed solely from the shed area by a pair of metal swing doors. All three of these areas have concrete block walls, open ceilings, and fluorescent fixtures mounted on the roof joists.

At an unknown date following abandonment, removable partitions were placed in some of the larger rooms, including most of the rooms along the east wall and the GSE area. At the time of field documentation, these partitions remained in place, and all Apollo-era equipment had been removed. The building's electrical and mechanical systems, however, are original.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 13

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CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 14

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CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 15

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CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 16

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HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

CAPE CANAVERAL AIR FORCE STATION, HAER No. FL-8-AN
LAUNCH COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
Freedom Road, Southwest of Launch Stand CX 34
Cape Canaveral
Brevard County
Florida

Penny Rogo Bailes, Photographer; Teresa Norman, Assistant Photographer, October 2006
(FL-8-AN-1 through FL-8-AN -30)

Penny Rogo Bailes, Photographer, October 2006 (FL-8-AN -31 through FL-8-AN -34)

- FL-8-AN-1 VIEW OF NORTH ELEVATION, FACING SOUTH.
- FL-8-AN-2 VIEW OF NORTH AND WEST ELEVATIONS, FACING SOUTHEAST.
- FL-8-AN-3 VIEW OF WEST ELEVATION, FACING EAST.
- FL-8-AN-4 VIEW OF SOUTH AND WEST ELEVATIONS, FACING NORTHEAST.
- FL-8-AN-5 VIEW OF SOUTH ELEVATION, FACING NORTH.
- FL-8-AN-6 VIEW OF SOUTH AND EAST ELEVATIONS, FACING NORTHWEST.
- FL-8-AN-7 VIEW OF EAST ELEVATION, FACING WEST.
- FL-8-AN-8 VIEW OF NORTH AND EAST ELEVATIONS, FACING SOUTHWEST.
- FL-8-AN-9 DETAIL OF WEST ELEVATION ROOF OVERHANG.
- FL-8-AN-10 DETAIL OF WEST STORAGE AREA, FACING NORTHEAST.
- FL-8-AN-11 DETAIL OF WEST ELEVATION, FACING SOUTHEAST.
- FL-8-AN-12 EXTERIOR OF LOCKER ROOM PROJECTION, FACING SOUTHEAST.
- FL-8-AN-13 DETAIL OF ELECTRICAL CART, WEST SHED AREA.
- FL-8-AN-14 VIEW OF ROOM 136, FACING SOUTHWEST.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
HAER No. FL-8-AN
INDEX TO PHOTOGRAPHS (page 2)

- FL-8-AN-15 EXTERIOR DOOR DETAIL, CORRIDOR 137, FACING EAST.
- FL-8-AN-16 VIEW OF CORRIDOR 137, FACING EAST.
- FL-8-AN-17 DETAIL OF ELECTRICAL PANEL, CORRIDOR 137.
- FL-8-AN-18 VIEW OF ROOM 124, FACING EAST.
- FL-8-AN-19 VIEW OF ROOM 135, FACING SOUTH.
- FL-8-AN-20 VIEW OF ROOM 112, FACING NORTHEAST.
- FL-8-AN-21 DETAIL OF ELECTRICAL PANEL, ROOM 112, FACING EAST.
- FL-8-AN-22 VIEW OF GROUND SUPPORT EQUIPMENT SHOP, ROOM 104, FACING NORTH.
- FL-8-AN-23 VIEW OF EASTERN PARTITION OF FRONT BAY ROOM, FACING SOUTH.
- FL-8-AN-24 VIEW OF EASTERN PARTITION OF FRONT BAY ROOM, FACING NORTHWEST.
- FL-8-AN-25 DETAIL OF ELECTRICAL ON/OFF SWITCH, FACING EAST.
- FL-8-AN-26 VIEW OF WESTERN PARTITION OF FRONT BAY ROOM, FACING NORTHWEST.
- FL-8-AN-27 VIEW OF WESTERN PARTITION OF FRONT BAY ROOM, FACING SOUTH.
- FL-8-AN-28 VIEW OF PIPES AND RAIL, A/C MECHANICAL EQUIPMENT ROOM, FACING SOUTHEAST.
- FL-8-AN-29 A/C MECHANICAL ROOM, FACING NORTHWEST.
- FL-8-AN-30 DETAIL OF HEATING/COOLING SYSTEM, A/C MECHANICAL EQUIPMENT ROOM, FACING NORTHEAST.

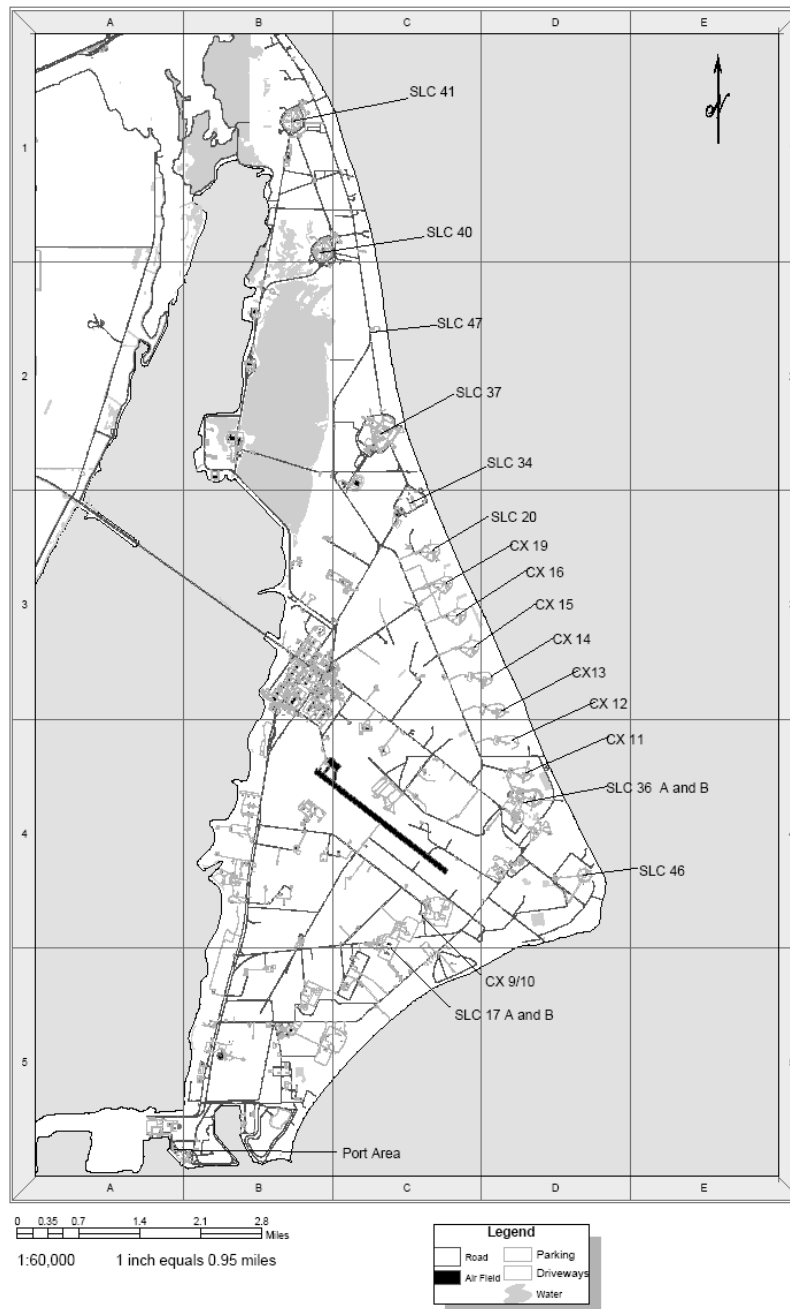
CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
HAER No. FL-8-AN
INDEX TO PHOTOGRAPHS (page 3)

Photograph Nos. FL-8-AN-31 through FL-8-AN-34 are photocopies of engineering drawings, and are 8" x 10" enlargements from 4" x 5" negatives. Original drawings are located at the Engineering Documentation Office, NASA KSC, Florida.

- FL-8-AN-31 Photocopy of drawing
OPERATIONS SUPPORT BUILDING
NASA, Cape Canaveral Air Force Station, Florida
Drawing 86K01547, Maurice H. Connell & Associates, February, 1961
OPERATIONS SUPPORT BUILDING SITE PLAN
Sheet 2 of 34
- FL-8-AN-32 Photocopy of drawing
OPERATIONS SUPPORT BUILDING
NASA, Cape Canaveral Air Force Station, Florida
Drawing 86K01547, Maurice H. Connell & Associates, February, 1961
OPERATIONS SUPPORT BUILDING FLOOR PLAN AND SCHEDULES
Sheet 4 of 34
- FL-8-AN-33 Photocopy of drawing
OPERATIONS SUPPORT BUILDING
NASA, Cape Canaveral Air Force Station, Florida
Drawing 86K01547, Maurice H. Connell & Associates, February, 1961
OPERATIONS SUPPORT BUILDING ELEVATIONS AND SECTION
Sheet 5 of 34
- FL-8-AN-34 Photocopy of drawing
OPERATIONS SUPPORT BUILDING
NASA, Cape Canaveral Air Force Station, Florida
Drawing 86K01547, Maurice H. Connell & Associates, February, 1961
OPERATIONS SUPPORT BUILDING ROOF PLAN, REFLECTED CEILING
PLAN, AND DETAILS
Sheet 7 of 34

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 17

Cape Canaveral Air Force Station



CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 18



Photo A-1. Operations Support Building, Complex 34, CCMTA, July 5, 1961.
Source: John F. Kennedy Space Center Archives, LOD-61-6101.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 19

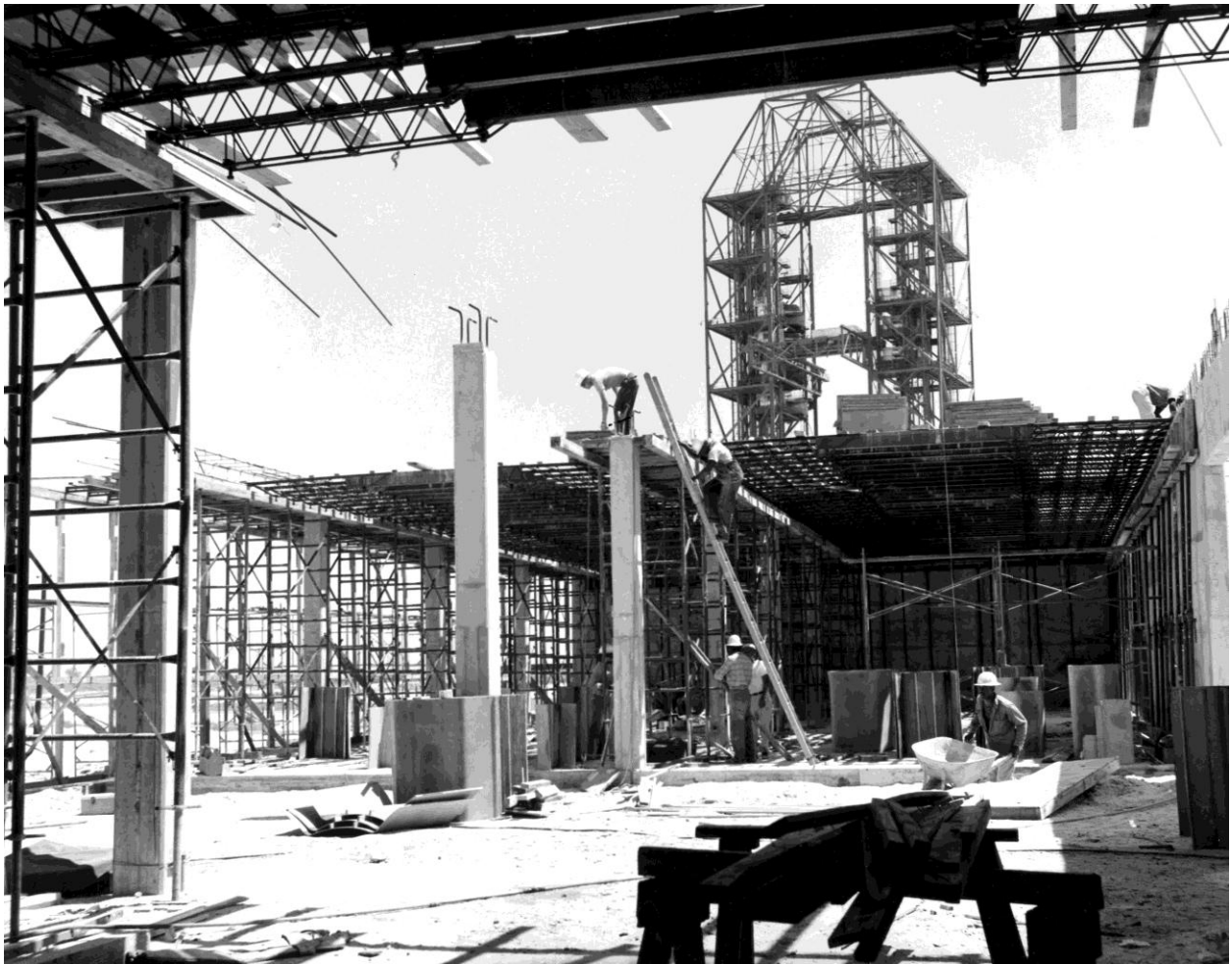


Photo A-2. Construction on Operations Support Building, Complex 34, CCMTA, July 17, 1961.
Source: John F. Kennedy Space Center Archives, LOD-61-6438.

CAPE CANAVERAL AIR FORCE STATION, LAUNCH
COMPLEX 34, OPERATIONS SUPPORT BUILDING
(Launch Complex 34, Engineering Support Building)
HAER No. FL-8-AN
Page 20



Photo A-3. Aerial view, operation support, Pad 34, CCMTA, September 15, 1961.
Source: John F. Kennedy Space Center Archives, LOD-61-7957.