

CAPE CANAVERAL AIR FORCE STATION,
ENGINEERING & OPERATIONS BUILDING
Northwest of Hangar Road, between NASA Parkway
and Industrial By-Pass Road
Cape Canaveral
Brevard County
Florida

HABS No. FL-583-C

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
U.S. Department of the Interior
100 Alabama Street, SW
Atlanta, GA 30303

HISTORIC AMERICAN BUILDINGS SURVEY

CAPE CANAVERAL AIR FORCE STATION,
ENGINEERING & OPERATIONS BUILDING
HABS No. FL-583-C

Location: Northwest of Hangar Road, between NASA Parkway and
Industrial By-Pass Road
Cape Canaveral Air Force Station (CCAFS)
Cape Canaveral
Brevard County
Florida

The Engineering & Operations (E&O) Building, Building No. 60650, is located within the Industrial Area of CCAFS, at latitude: 28.488885, longitude: -80.584500. These coordinates were obtained on September 19, 2013, through Google Earth™. The coordinates datum are North American Datum 1983.

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

Present Use: Vacant

Significance: The E&O Building is considered a contributing resource to a NASA-owned CCAFS Industrial Area Historic District, which is eligible for listing in the National Register of Historic Places under Criterion A, in the area of Space Exploration and under Criterion C, in the area of Architecture. The E&O Building contributes to the district under Criterion A for its association with NASA's Project Mercury and unmanned space programs, and under Criterion C as a representative example of International-style military architecture at CCAFS. The building retains all seven aspects of historic integrity.¹

Historian: Patricia Slovinac, Architectural Historian
Archaeological Consultants, Inc. (ACI)
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Sarasota, Florida 34240

September 2014

Project Information: The documentation of the Cape Canaveral Air Force Station, Engineering & Operations Building, was conducted in 2013-2014 for KSC by ACI,

¹ David Price, "Architectural Survey and Evaluation of NASA-owned Facilities on Cape Canaveral Air Force Station, Brevard County, Florida" (survey report, New South Associates, Stone Mountain, GA, 2014), 80.

under contract to InoMedic Health Applications (IHA), and in accordance with KSC's Programmatic Agreement Regarding Management of Historic Properties, dated May 18, 2009. The field team consisted of architectural historian, Patricia Slovinac (ACI), and independent photographer, Penny Rogo. Assistance in the field was provided by Barbara Naylor, KSC Historic Preservation Officer, and Nancy English, KSC Cultural Resource Specialist. The written narrative was prepared by Ms. Slovinac; it was edited by Joan Deming, ACI Project Manager; Elaine Liston, KSC Archivist; Ms. Naylor; Ms. English; and Jane Provancha, Environmental Projects-Manager, IHA. The photographs and negatives were processed by Zebra Color, Inc., an independent photography and processing studio.

The Scope of Services for the project, which was compiled based on the Programmatic Agreement, specified a documentation effort following HABS Level II Standards. Information for the written narrative was primarily gathered through informal interviews with current NASA and contractor personnel, the KSC Archives Department, the KSC Institutional Imaging Facility, the CCAFS Cultural Resources Department and Infrastructure Operations and Maintenance Service Engineering Documentation Center, the Air Force Space and Missile History Center, and various NASA center websites. Selected drawings were provided by KSC's Engineering Documentation Center, which serves as the repository for all facility drawings. For the E&O Building, this included the original as-built drawings, as well as drawings depicting major additions and modifications to the facility. It should also be noted that KSC does not periodically produce drawings of their facilities to show current existing conditions.

LIST OF ACRONYMS

ACI	Archaeological Consultants, Inc.
ACOE	Army Corps of Engineers
AFB	Air Force Base
CCAFS	Cape Canaveral Air Force Station
DoD	Department of Defense
E&O	Engineering & Operations [Building]
ELV	Expendable Launch Vehicle
IHA	InoMedic Health Applications
KSC	Kennedy Space Center
LC	Launch Complex
NASA	National Aeronautics and Space Administration
US	United States
USSR	Union of Soviet Socialist Republics
VAFB	Vandenberg Air Force Base

Part I. Historical Information

A. Physical History:

- 1. Date of erection:** The original section of the E&O Building, also known as the South Wing (Figure No. A-1), was constructed between September 1960 and April 1961.²
- 2. Architect/Engineer:** The original building was designed by Griffin & Gomon Architects, Daytona Beach, Florida; Gee & Jenson Consulting Engineers, Palm Beach, Florida; and the Army Corps of Engineers (ACOE), Jacksonville, Florida.³ The North Wing addition was designed by the ACOE.⁴
- 3. Original and subsequent owners, occupants, uses:** The E&O Building was originally owned by the United States (US) Air Force's Patrick Air Force Base (AFB) and used by NASA as offices for personnel involved with Project Mercury. On December 17, 1963, ownership of the building was transferred to NASA to provide offices for the Unmanned Launch Operations Division. Circa 2000, it became office space for the Expendable Launch Vehicle (ELV) Program. At the time of documentation, the facility was vacant.⁵
- 4. Builder:** The builder of the South Wing was Biltmore Construction Company of St. Petersburg, Florida; the contractor for the North Wing was R. E. Clarson, Inc. of St. Petersburg, Florida.⁶
- 5. Original plans and construction:** The original drawings for the E&O Building are dated August 1960. The roughly 29,216-square foot facility was rectangular in plan, two stories in height, and featured a recessed main entrance. The main entrance opened into a lobby area. A reproduction area and conference room were located in the north end of the first floor; the remainder of the building contained offices.⁷
- 6. Alterations and additions:** From 1963 to 1964, a 6,900-square foot addition was constructed to the north end of the original building. Also known as the North Wing, it contained additional office areas and engineering laboratories.⁸ A facility usage plan from

² NASA KSC, "Real Property Record, Building 60650," on file, KSC Real Property Office.

³ Griffin & Gomon Architects, "Engineering & Operations Bldg for N.A.S.A.," August 1960, on file, KSC Engineering Documentation Center.

⁴ ACOE, "3rd Addition to E. & L. Building and 1st Addition to E. & O. Building," 1963, on file, KSC Engineering Documentation Center.

⁵ NASA KSC, "Building 60650;" David Darling, "History of Kennedy Space Center," *The Encyclopedia of Science*, accessed September 19, 2013, <http://www.daviddarling.info/encyclopedia/K/KSC.html>.

⁶ NASA KSC, "Building 60650;" Photo No. LOC-63-569, on file, KSC Archives Department.

⁷ Griffin & Gomon Architects, "Engineering & Operations Bldg."

⁸ NASA Marshall Space Flight Center, "Master Development Plan for NASA Technical Facilities at AMR, Revision II," January 1961, 21, File No. ARCH00017251, on file, KSC Archives Department, Florida. "E&O Building,"

1966 shows that by this time, a few of the original rooms in both wings had been subdivided.⁹ By 1969, some internal partitions were removed to create large office areas, while other rooms were partitioned into smaller spaces.¹⁰ A space utilization plan from 1985 shows changes in the sizes of some of the rooms; either individual rooms were subdivided, or multiple rooms were combined into one large space.¹¹ Additional minor changes were made to the building over the next fifteen years. Circa 2000, the E&O Building underwent an extensive renovation, during which nearly every room in the facility was changed. In addition, an elevator and equipment shaft was constructed on the west face of the building across from the lobby area.¹²

B. Historical Context:

Cape Canaveral Air Force Station

With the increasing concern over the Union of Soviet Socialist Republic's (USSR) missile and nuclear development after World War II, the Department of Defense (DoD) created the Committee on Long Range Proving Grounds in October 1948. One of their first duties was to select a suitable missile test site. Four locations were examined, including an area near Washington State, with tracking stations in the Aleutian Islands of Alaska; the Naval Air Missile Test Center at Point Mugu, California; the Naval Air Station at El Centro, California; and Cape Canaveral, Florida, which was near the existing Banana River Naval Air Station (now Patrick AFB).¹³ Cape Canaveral was eventually selected for several critical reasons. First, the Government owned land at the Cape, and the undeveloped nature of the remaining land made it less expensive to acquire. Secondly, its isolated location enhanced security for research and development. Finally, the launch area was accessible via water, easing the logistics of transporting heavy rockets and building supplies. Operationally, missiles could be launched over the Atlantic Ocean and tracked from islands, such as Bermuda. In addition, Florida's temperate climate allowed year round operation of a missile site.¹⁴

September 1, 1973, Sweetsir Collection, Box 47B.7, Folder: Technical Facilities Resume Sheets, KSC Archives Department, Florida.

⁹ NASA KSC, "Space Control Document-Cape Area," 1966, on file, KSC Real Property Office.

¹⁰ "Description: Engineering and Operations Building," 1972, Sweetsir Collection, Box 47B.7, Folder No.: E&O, KSC Archives Department, Florida.

¹¹ NASA KSC, "Building 60650."

¹² Jones Edmonds & Associates, Inc., "Rehabilitate Building E&O at Cape Canaveral Air Force Station," April 1999, on file, KSC Engineering Documentation Center; NASA KSC, "Building 60650."

¹³ Harry A. Butowsky, *National Historic Landmark Federal Agency Nomination, Cape Canaveral Air Force Station* (Washington, DC: National Park Service, 1983), 8-2. For ease of discussion, the name Patrick AFB will be used throughout the context.

¹⁴ 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., March 16, 1984), 3-4; Charles D. Benson and William B. Faherty, *Gateway to the Moon: Building the Kennedy Space Center Launch Complex*

In May 1949, President Harry S. Truman signed the legislation to officially establish the Joint Long Range Proving Ground at Cape Canaveral with Patrick AFB as the support base. Although the entire facility was initially under the cooperative use of the Army, Navy, and Air Force, the latter, by a directive of the DoD, ultimately assumed responsibility for the Range. Subsequently, on May 16, 1950, the Cape Canaveral Missile Range was redesignated as the Long Range Proving Ground, the first of many subsequent name changes.¹⁵

Construction at the southern tip of Cape Canaveral commenced in July 1950, under the direction of the Jacksonville District of the ACOE. These activities included the construction of Port Canaveral and Launch Complexes (LCs) 1, 2, 3, and 4. Although not fully completed, the Army conducted the first successful launch, a Bumper rocket from LC 3, on July 24, 1950. Construction of LC 3 was completed by 1951. By 1952, LC 4 was finished, followed closely by LC 1 and LC 2 in 1953.¹⁶

During the late 1940s and early 1950s, Air Force activities at CCAFS focused on winged cruise missile research and development as a deterrent force in the weapons race between the United States and the USSR. The earliest launch pads (LCs 1, 2, 3, 4, 9, 10, 21, and 22), located at the southern tip of the CCAFS, were used for firing experimental winged missiles including the Lark, Matador, Navaho, Snark, Bomarc, Bull Goose, and Mace. Support buildings, including a communications building, a water plant, a fire fighting unit, electrical substations, a skid strip for the landing and reuse of the missiles, and Hangars C and O, were constructed near these original launch pads.¹⁷

In 1952, the USSR detonated their first thermonuclear device. Additionally, intelligence reports indicated that they were developing long-range missiles. In response to these actions, the United States began to advance their ballistic missile development, and by 1955, Air Force officials convinced President Eisenhower to assign the highest national priority to the intercontinental ballistic missile development program. Subsequently, the DoD approved two intermediate range ballistic missile programs: the Air Force's Thor Program and the Army/Navy's Jupiter Program. Both were developed simultaneously and were assigned an equal national priority.¹⁸

(Gainesville, FL: University Press of Florida, 2001), 1; Butowsky, *Cape Canaveral Air Force Station*, 8-2; Cliff Lethbridge, "The History of Cape Canaveral," *Spaceline.org*, 2000.

¹⁵ Lethbridge, "Cape Canaveral." For ease of reference, it will be referred to as CCAFS (Cape Canaveral Air Force Station) throughout the text.

¹⁶ Butowsky, *Cape Canaveral Air Force Station*, 7-3 and 7-4; Lethbridge, "Cape Canaveral."

¹⁷ Barton and Levy, *Cape Canaveral Air Force Station*, 6, 25; E.R. Bramlitt, *History of Canaveral District 1950-1971* (South Atlantic Division, US Army Corps of Engineers, 1971); Jacob Neufeld, *The Development of Ballistic Missiles in the United States Air Force, 1945-1960* (Washington, DC: USAF, Office of Air Force History, 1990), 239.

¹⁸ Neufeld, *Development of Ballistic Missiles*, 143-48, 242.

The drive to develop more accurate and powerful weapons led to the construction of numerous launch complexes within CCAFS. Since the Government maintained programs for both intercontinental ballistic missiles and intermediate range ballistic missiles, launch complexes for both types of missiles were constructed at CCAFS. Over time, the southern area of CCAFS was developed for launching intermediate range ballistic missiles (Redstone, Pershing, Polaris/Poseidon, and Thor) and included LCs 5, 6, 17, 18, 25, 26, 29, and 30; LCs 9 and 10 in this area were used for the Navaho winged intercontinental missile. The northern area of CCAFS was developed for launching intercontinental ballistic missiles and space launch vehicles (Atlas, Titan, Saturn) and included LCs 11, 12, 13, 14, 15, 16, 19, 20, 34, 36, and 37.¹⁹

In 1955, President Dwight D. Eisenhower announced that the United States would launch an unmanned satellite as part of the nation's participation in the International Geophysical Year, which was planned for July 1957 through December 1958. Initially, the US Navy's Project Vanguard was chosen to complete this task. Although the Vanguard made use of the reliable Viking rocket, the first test flight did not occur until December 8, 1956, with the second test flight launching on May 5, 1957; both lifted off from CCAFS. After the successful Soviet launches of Sputnik I (October 4, 1957) and Sputnik II (November 3, 1957), and the failure of the third Vanguard test flight, President Eisenhower and the DoD approved the Army's Explorer Project, which was under its Development Operations Division led by Dr. Wernher von Braun.²⁰ The United States successfully entered the space race with the launch of the Army's scientific satellite Explorer I from CCAFS on January 31, 1958, using a four stage Jupiter C missile named Juno I.²¹

Realizing that the military's involvement in the space program would jeopardize the goal of using space for peaceful purposes, the President's Science Advisory Committee urged that a centralized agency be created to oversee the scientific exploration of space. The new agency, NASA, was established on October 1, 1958, as a civilian agency with the mission of carrying out scientific aeronautical and space exploration activities for both manned and unmanned programs. The DoD, especially the Air Force, would continue with defense related missile and satellite development.²² Within NASA, development of a manned spaceflight program was given to the

¹⁹ Barton and Levy, *Cape Canaveral Air Force Station*, 4, 9; Denise P. Messick, Cynthia G. Rhodes, and Charles E. Cantley, *45th Space Wing Cultural Resource Management Plan*, Technical Report No. 386 (Stone Mountain, GA: New South Associates, 1996), 95; James N. Gibson, *Nuclear Weapons of the United States: An Illustrated History* (Atglen, PA: Schiffer Publishing, Ltd., 2000).

²⁰ Benson and Faherty, *Gateway to the Moon*, 1-2.

²¹ Roger D. Launius, *NASA: A History of the US Civil Space Program* (Malabar, FL: Krieger Publishing Company, 2001), 21-8.

²² R. Cargill Hall, "Civil-Military Relations in America's Early Space Program," in *The US 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, DC: USAF, USAF History and Museums Program, 1998), 30; Barton and Levy, *Facilities at Cape Canaveral Air Force Station*, 20; David N. Spires, "The Air Force and Military Space Missions: The Critical Years, 1957-1961," in Hall and Neufeld, *The US Air Force in Space*, 34-35, 39.

Space Task Group stationed at Langley Research Center in Hampton, Virginia, principally because members of the group had previously been examining manned spaceflight while they were employees of the National Advisory Committee on Aeronautics, NASA's predecessor. The unmanned programs would be distributed among the NASA centers.

On October 1, 1958, the National Space and Aeronautics Act abolished the National Advisory Committee on Aeronautics and created a Civilian-Military Liaison Committee, which resulted in the transfer of several military-operated unmanned space programs to NASA. This included the US Navy's Project Vanguard, as well as 400 scientists from the Naval Research Laboratory. The US Army and US Air Force handed over their lunar probe responsibilities and rocket engines (such as the F-1 engine) to NASA. NASA immediately gave operational control of these projects back to their respective DoD divisions while the fledgling agency proceeded to organize itself.²³ In December 1958, the Army's Jet Propulsion Laboratory group (operated by the California Institute of Technology) was reassigned to NASA, and in 1959, a portion of the Army's Development Operations Division in Huntsville, Alabama, as well as the Saturn vehicle program, including the team led by Dr. Wernher von Braun, also was transferred to NASA.²⁴

Project Mercury

Project Mercury was NASA's first manned spaceflight program, and was active from December 1958 through May 1963. Some of the program's personnel were housed in the E&O Building, although the majority remained at Langley. The goals of the project were to "(1) Place a manned spacecraft in orbital flight around the Earth. (2) Investigate man's performance capabilities and his ability to function in the environment of space. (3) Recover the man and the spacecraft safely."²⁵ Over the course of the program, NASA successfully designed a vehicle that could survive the conditions of space, as well as atmospheric reentry; hired and trained the first US astronauts; developed a worldwide tracking network; created mission control procedures that became the protocol for all future programs; and launched twenty-six missions (manned and unmanned).

All twenty-six missions launched as part of Project Mercury occurred between August 1959 and May 1963. Each of these flights fell into one of three mission categories: research and

²³ Frank W. Anderson, Jr., *Orders of Magnitude: A History of NACA and NASA, 1915-1980* (Washington, DC: NASA, Scientific and Technical Information Branch, 1981), 20.

²⁴ Jane Van Nimmen and Leonard C. Bruno (with Robert L. Rosholt), *NASA Historical Databook, 1958-1968, Vol. 1: NASA Resources* (Washington, DC: NASA, Scientific and Technical Information Office, 1976), 5. Included with Von Braun's team was the Missile Firing Laboratory, which was stationed at Cape Canaveral. This group became NASA's Launch Operations Directorate. Led by Dr. Kurt Debus, this group managed the overall integration, testing, and the launch operations of NASA; it would later become the nucleus of KSC.

²⁵ Walter C. Williams, et al., "Project Review," in *Mercury Project Summary Including the Results of the Fourth Manned Orbital Flight, May 15 and 16, 1963 [SP-45]* (Washington, DC: NASA, Office of Scientific and Technical Information, 1963), 2.

development, qualification, or manned. Of the twenty-six missions, seven were considered research and development, thirteen were classified as qualification, and six were manned flights. Seventeen of the missions, including all of the manned flights, launched from CCAFS; the remaining nine lifted-off from Wallops Island, Virginia. During this time, seven missions launched from LC 5, including the first US suborbital ballistic flight of Alan Shepard (May 5, 1961) with a Redstone rocket, and ten launched from LC 14, including the first US orbital flight of John Glenn (February 20, 1962) with an Atlas rocket. The CCAFS also provided facilities for the worldwide tracking network, such as the original Mercury Control Center and Hangar S for simulators and astronaut quarters. Despite the pace of Project Mercury, the United States was unable to beat the Russians, who had successfully launched cosmonaut Yuri Gagarin on April 12, 1961.

Unmanned Space Programs

The Navy personnel and facilities associated with Project Vanguard were reassigned to NASA's planned space projects center in Greenbelt, Maryland; on May 1, 1959, NASA announced this new center would be designated as the Goddard Space Flight Center (Goddard). Twenty of these employees formed the Vanguard Group, which was responsible for launch operations of the vehicle at CCAFS. With the establishment of Goddard, this team became the Florida Launch Operations Division and remained here to oversee the remainder of the Vanguard launches. In May 1960, the group supported the launch of NASA's Delta-1, the first official Goddard-developed launch vehicle. This team, headed by Dr. Robert H. Gray, "provided the management and technical direction of the field efforts" for launch operations of various spacecraft; they also monitored and directed launch vehicle preparations and coordinated spacecraft checkout.²⁶

Between its establishment and September 30, 1965, Goddard's Launch Operations Division oversaw fifty-five unmanned rocket launches at CCAFS, forty-seven of which were considered successful. Vehicles used included Vanguard; Thor-Able I, II, III, and IV; Delta; Delta A, B, C, and D; Atlas-Agena B and D; Atlas-Antares; Atlas-Centaur; and Titan III-C. The type of launch vehicle used was based on the weight of the payload, its orbital destination, and its purpose.²⁷ Notable missions from this time period include:

- Explorer VI was launched from LC 5/6, Pad 5, August 7, 1959, aboard a Thor-Able III booster. Goddard considers this their first satellite, as all others up to this point were the "result of pre-NASA programs." Experiments and instrumentation aboard this spacecraft

²⁶ NASA, *America's Spaceport* (Kennedy Space Center: NASA, 2010), 17; Alfred Rosenthal, *Venture into Space: Early Years of Goddard Space Flight Center* (Washington, DC: NASA, Office of Technology Utilization, 1968), 23-29, 60; "Launch Team Consolidated with Goddard Transfer," *Spaceport News*, October 1, 1965, 1 and 4. A similar team was stationed at Vandenberg Air Force Base (VAFB), Lompoc, California.

²⁷ Clifford J. Lethbridge, "Cape Canaveral Launch Vehicles Box Score," *Spaceline.org*, 2014, http://www.spaceline.org/statistics/Cape_Canaveral_Launch_Vehicles_Box_Score.html.

studied the Van Allen radiation belts, the Earth's magnetic field and cloud cover, micrometeoroids, and very low-frequency radio signals.²⁸

- Tiros I was launched from LC 17, Pad A, on April 1, 1960, atop a Thor-Able II booster. It was the first US meteorological satellite. During its seventy-eight day life, Tiros I took over 20,000 photographs depicting the Earth's cloud cover. Atmospheric characteristics such as jet streams, warm and cold fronts, and thunderstorms were depicted in many of the images.²⁹
- Ariel I was launched from LC 17, Pad A, on April 26, 1962, aboard a Delta rocket. It was a joint project of the US and the United Kingdom, this first international satellite was equipped with instrumentation and experiments to study the solar atmosphere and ionosphere. It transmitted data to NASA through November 1963.³⁰
- Telstar 1 was launched from LC 17, Pad B, on July 10, 1962, atop a Delta booster. It was the first active communications satellite, a product of the American Telephone and Telegraph Company (AT&T), and soon led to a debate in the US Congress as to how such satellites would operate, by private industry, public utility, or Governmental agency. Ultimately, this debate led to the "Communications Satellite Act of 1962," signed by President Kennedy on August 31.³¹
- Mariner 2 was launched from LC 12, on August 27, 1962, aboard an Atlas-Agena B rocket. It was the first successful US planetary probe. The probe came within 22,000 miles of Venus and provided the first scan of a planet other than Earth.³²
- The Ranger 7 spacecraft, was launched from LC 12, July 28, 1964, atop an Atlas-Agena D, was the first US vehicle to impact the Moon. Prior to its landing, the spacecraft took over 4,000 photographs of the lunar surface, which NASA would use to plan its Apollo lunar landings.³³

On October 1, 1965, NASA's east and west coast unmanned launch activities were formally transferred to KSC and consolidated as the Unmanned Launch Operations Directorate. While the management of the various unmanned programs remained at different NASA centers, this action

²⁸ Rosenthal, *Venture into Space*, 79-80, 82; Lethbridge, "Launch Vehicles Box Score."

²⁹ Rosenthal, *Venture into Space*, 88-89; NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

³⁰ Rosenthal, *Venture into Space*, 109-110; Lethbridge, "Launch Vehicles Box Score."

³¹ Rosenthal, *Venture into Space*, 79-80, 82; Lethbridge, "Launch Vehicles Box Score."

³² NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

³³ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

effectively placed KSC in control of all NASA launches except for the Scout rockets.³⁴ The group operated under the name Unmanned Launch Operations until 1985. During this twenty-year period, the team continued its mission of launching lunar and planetary spacecraft, and scientific, meteorological, and communications satellites. NASA's unmanned vehicles also helped maintain a US presence in space during the void between the Apollo and Space Shuttle programs. In the early years of the Space Shuttle Program, NASA's intent was to use the shuttle for all satellite launches, although this never happened.³⁵ Some of the notable missions from this period include:³⁶

- Surveyor 1 was launched from LC 36, Pad A, on May 30, 1966, aboard an Atlas-Centaur booster. This was the first US spacecraft to make a soft landing on the Moon's surface; it relayed thousands of photographs to Earth, which NASA could use to plan the Apollo lunar landings.³⁷
- LANDSAT 1 was launched from Space Launch Complex-2 West at Vandenberg Air Force Base (VAFB), California, on July 23, 1972, atop a Delta rocket. It was the first satellite to conduct a major assessment of the Earth's resources, such as agricultural, forest, mineral, and water, from space. NASA turned off the satellite in January 1978.³⁸
- Helios 1 was launched from LC 41, on December 10, 1974, aboard a Titan III-E Centaur. The satellite flew within the outer corona of the Sun to measure its density, temperature, velocity, and magnetic field. It continued to transmit data to NASA until 1985.³⁹
- The Viking 1 spacecraft was launched from LC 41 on August 20, 1975, atop a Titan III-E Centaur booster. This vehicle carried an orbiter, which it placed in orbit around Mars, and a lander that it sent to the planet's surface. The key goal was to find life on Mars.⁴⁰
- The Pioneer Venus Orbiter was launched from LC 36, Pad A, on May 20, 1978, aboard an Atlas-Centaur rocket. This was the first satellite to orbit Venus. It studied the planet's atmosphere and surface, and compiled radar maps of its surface features.⁴¹

³⁴ "Launch Team Consolidated with Goddard Transfer," *Spaceport News*, October 1, 1965, 1 and 4. The Scout rockets remained under the jurisdiction of the Langley Research Center in Hampton, Virginia, which launched the vehicles from Wallops Station in Virginia, and VAFB in California.

³⁵ Barton and Levy, *Facilities at Cape Canaveral Air Force Station*, 20-27; NASA Public Affairs, *The Kennedy Space Center Story* (Kennedy Space Center: NASA, 1991), <http://www.nasa.gov/centers/kennedy/about/history/story/ch2.html>.

³⁶ Unless otherwise noted, the specified launch complex/launch pad is at CCAFS.

³⁷ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

³⁸ NASA, *America's Spaceport*, 21.

³⁹ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁴⁰ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁴¹ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

- The Infrared Astronomical Satellite was launched from Space Launch Complex-2 West at VAFB, on January 25, 1983, atop a Delta rocket. It was the satellite to conduct a detailed infrared examination of the universe. Results from its ten-month mission included the discovery of new stars being born, and evidence of the possible evolution of new planetary systems.⁴²

In 1985, the Unmanned Launch Operations Directorate became the Expendable Vehicle Operations Directorate; the group continued to fall under the jurisdiction of KSC. Its mission remained the same, and over the next several years, the team would begin to provide launch services for commercial vehicles and payloads. In January 1983, President Ronald Reagan's administration had begun to encourage private industry to manufacture ELVs to deliver commercial payloads; Government launch facilities at KSC and VAFB would be made available for their use. Commercial development of space vehicles received a further boost following the Space Shuttle *Challenger* accident in January 1986, when NASA decided that the Space Shuttle would no longer deploy commercial satellites.⁴³ The Expendable Vehicle Operations Directorate would operate as such until 1997. Some of the notable missions from this period are as follows:

- The SOHO (Solar and Heliospheric Observatory) satellite was launched from LC 36, Pad B, on December 3, 1995, aboard an Atlas IAS-Centaur booster. This spacecraft gathered data on the internal structure and outer atmosphere of the Sun, as well as the origin of the solar wind.⁴⁴
- The NEAR (Near Earth Asteroid Rendezvous) Shoemaker was launched from LC 17, Pad B, on February 17, 1996, atop a Delta II rocket. It was the first satellite to conduct a long-term, close-up examination of an asteroid's surface; its mission lasted one year.⁴⁵
- The Mars Pathfinder vehicle was launched from LC 17, Pad B, on December 4, 1996, aboard a Delta II rocket. The vehicle carried a small robotic rover, the *Sojourner*, to Mars so it could study the planet's surface and record data about its ancient rocks.⁴⁶
- The Cassini spacecraft was launched from LC 40, on October 15, 1997, atop a Titan IV-B booster. Cassini performed gravity-assisted flybys of Venus and Jupiter, before arriving at Saturn in July 2004 to observe the planet and its moons. This vehicle also carried the European Space Agency's Huygens probe, which was deployed to Titan, Saturn's largest moon.⁴⁷

⁴² NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁴³ NASA Public Affairs, *The Kennedy Space Center Story*.

⁴⁴ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁴⁵ NASA, *America's Spaceport*, 21.

⁴⁶ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁴⁷ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score;" NASA, *NASA's Launch Services Program* (Kennedy Space Center: NASA, 2013), 4.

In 1997, NASA consolidated its ELV Program at KSC, naming it the lead center for the acquisition and management of ELV launch services. Per this announcement, KSC assumed the role of coordinating the requirements for all ELV customers, in addition to continuing to conduct launch operations.⁴⁸ In 1998, the ELV Program merged with the Payload Carriers Program as a single program office at KSC; at this time, an ELV Launch Services Division was created. In 2003, the ELV & Payload Carriers Program Office was renamed the Launch Services Program; it retained its core functions of acquiring and managing ELV missions. Circa 2014, the Launch Services Program was using a mixed fleet of vehicles, some developed by private contractors (Pegasus XL, Falcon 1, Falcon 9, and Taurus XL) and others that are upgraded versions of old NASA/military rockets (Delta and Atlas).⁴⁹ Some of the notable missions since 1998 include:

- The Mars Exploration Rovers *Spirit* and *Opportunity* were launched from LC 17, Pad A, on June 10, 2003, and from LC 17, Pad B, on July 6, 2003, respectively, atop Delta II rockets. These two vehicles landed at different locations on Mars and have provided additional data about the planet's surface.⁵⁰
- The Space Infrared Telescope Facility (Spitzer Space Telescope) was launched from LC 17, Pad B, on August 25, 2003, aboard a Delta II rocket booster. This telescope was the fourth of NASA's "Great Observatories," the others being Hubble Space Telescope, the Compton Gamma Ray Observatory, and the Chandra X-Ray Observatory, and the only one delivered to space by an expendable vehicle; the others were carried aboard one of the Space Shuttles. The mission of this telescope is to obtain images through the detection of infrared energy (heat) radiated by objects in space.⁵¹
- The MESSENGER spacecraft was launched from LC 17, Pad B, on August 3, 2004, aboard a Delta II rocket. It is the first vehicle to orbit and map Mercury.⁵²
- The New Horizons vehicle was launched from LC 41, on January 19, 2006, atop an Atlas V rocket is traveling to the edge of our solar system. Its goal is to explore the composition of Pluto and its moon (Charon), and study the Kuiper Belt, which consists of ancient icy bodies that orbit beyond Neptune.⁵³

⁴⁸ Prior to this administrative change, Goddard and the Glenn Research Center in Cleveland, Ohio, performed some of the coordination tasks, such as matching spacecraft to boosters and conducting mission design and analysis. George H. Diller, "Kennedy Assumes Lead for Acquisition and Management of Expendable Launch Vehicle Launch Services," KSC News Release No. 206-97, October 28, 1997, <http://www.nasa.gov/centers/kennedy/news/releases/1990/index.html>; NASA KSC, "Annual Report Fiscal Year 1998," 1998, 10, http://www.nasa.gov/centers/kennedy/about/annual_rpt/annual_rpt-index.html#U5h_7xAKS8A.

⁴⁹ NASA, *Launch Services Program: Earth's Bridge to Space* (Kennedy Space Center: NASA, 2012), 1, http://www.nasa.gov/sites/default/files/files/LSP_Brochure_508.pdf; NASA, *NASA's Launch Services Program*.

⁵⁰ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁵¹ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁵² NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁵³ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

- The Kepler spacecraft was launched from LC 17, Pad B, on March 6, 2009, aboard a Delta II booster. Its mission is to search for Earth-size and smaller planets that orbit around other stars. The focus is on the habitable zone, where liquid water may exist on the surface of such planets.⁵⁴
- The Mars Science Laboratory, carrying the *Curiosity* rover, was launched from LC 41, on November 26, 2011, atop an Atlas V rocket. The goals of the mission, which is part of the Mars Exploration Program, are to help determine if life ever existed on Mars, characterize the climate and geology of the planet, and prepare for human exploration.⁵⁵
- The MAVEN spacecraft was launched from LC 41, on November 18, 2013, aboard an Atlas V booster, is part of the Mars Exploration Program. The spacecraft will study the planet's upper atmosphere. Scientists hope to use the data to explain how Mars' climate has changed due to the loss of atmospheric gases.⁵⁶

E&O Building

Circa 1958, the ACOE commissioned Griffin & Gomon Architects, an architecture firm from Daytona Beach, Florida, and Gee & Jenson Consulting Engineers, an engineering firm based in Palm Beach, Florida, to design the E&O Building, to be located along Hangar Road in the Industrial Area of CCAFS. The earliest drawings were examined and approved by ACOE District Engineer, Col. Paul D. Troxler, in June 1958, about one month before President Dwight D. Eisenhower signed the National Aeronautics and Space Act, which officially established NASA as a Government agency. Following the activation of NASA and the selection of CCAFS as the Project Mercury launch site, the US Air Force decided to give NASA use of the E&O Building.

A site plan completed in May 1960, by Pan American World Airways, Inc. shows the South Wing as the current project and indicates a "future addition" where the North Wing eventually would be built.⁵⁷ However, the original as-built drawings for the E&O Building contain no reference to a north wing or later addition; instead, it shows a sand and gravel parking lot to the north of the building. The drawings for the original E&O Building were finalized and accepted by the ACOE in August 1960.⁵⁸

⁵⁴ NASA, *America's Spaceport*, 21; Lethbridge, "Launch Vehicles Box Score."

⁵⁵ NASA Jet Propulsion Laboratory, "Mars Scientific Laboratory Curiosity Rover," accessed May 13, 2014, <http://mars.jpl.nasa.gov/msl/>; Lethbridge, "Launch Vehicles Box Score."

⁵⁶ NASA, "The MAVEN Mission," accessed May 13, 2014, <http://www.nasa.gov/content/maven-launch/index.html#.U3JLFyhczQX>; Lethbridge, "Launch Vehicles Box Score."

⁵⁷ Pan American World Airways, Inc., "Site & Detail Site Plan," May 1960, on file, Infrastructure Operations and Maintenance Service Engineering Documentation Center, Cape Canaveral Air Force Station.

⁵⁸ Griffin & Gomon Architects, "Engineering & Operations Bldg for N.A.S.A.," Sheet No. 4.

On September 26, 1960, Biltmore Construction Company of St. Petersburg, Florida, began construction of the South Wing; work was finished seven months later on April 26, 1961 (Figure Nos. A-2, A-3).⁵⁹ As described in a January 1961 Master Development Plan, the E&O Building was set to hold roughly 184 NASA and contractor personnel assigned to Project Mercury and unmanned space programs. The plan also noted the future north wing of the E&O Building would hold additional offices and laboratories, which was scheduled for completion in June 1963.⁶⁰

Construction of the North Wing by R. E. Clarson, Inc. of St. Petersburg, Florida, began by January 1963 (Figure Nos. A-4, A-5, A-6). Photographs indicate that the external shell of the addition was completed by May of that year; the completion of the addition was logged into the real property record on March 30, 1964. Roughly three months earlier, on December 17, 1963, ownership of the facility was transferred from the US Air Force to NASA KSC.⁶¹ By this time, Project Mercury had come to a close (the last flight was in May 1963), even though the unmanned launch operations continued at CCAFS and NASA.

Between 1964 and 1966, modifications were made to five of the first floor rooms and sixteen of the second floor rooms. These modifications consisted of the repartitioning of groups of adjacent rooms to form larger or smaller spaces. By 1969, three rooms on the first floor and eight on the second floor underwent similar changes. A space utilization plan from 1985 shows changes to sixteen rooms on the first floor and sixteen rooms on the second floor; like the earlier renovations, groups of rooms were repartitioned to form smaller or larger spaces. Throughout this time, the facility was "being utilized entirely as an administrative and engineering office complex in support of the Unmanned Launch Operations Directorate of KSC." To assist with these operations, the E&O Building contained a large conference room with a projection booth and a telemetry data display room.⁶²

As noted in the real property record, additional minor changes were made to the E&O Building over the next fifteen years.⁶³ Circa 2000, the E&O Building underwent extensive renovations to house the ELV Program. At this time, nearly every room in the facility received some level of modification. Rooms such as the first floor conference room, the director and deputy director offices, and service/utility spaces underwent smaller changes, such as new floor and wall materials. Others were repartitioned to form large office spaces with cubicles or smaller individual offices. In addition, the main entrance to the building was altered for accessibility, and an elevator was constructed on the west face of the building. Gradually, the offices for the ELV

⁵⁹ NASA KSC, "Building 60650."

⁶⁰ NASA MSFC, "Master Development Plan, Revision II," 3, 21.

⁶¹ NASA KSC, "Building 60650."

⁶² "Description: Engineering and Operations Building," 1972, Sweetsir Collection, Box 47B.7, Folder No.: E&O, KSC Archives Department, Florida; NASA KSC, "Building 60650;" NASA KSC, "Space Control Document-Cape Area."

⁶³ NASA KSC, "Building 60650."

Program (which had become part of the Launch Services Program in 2003) moved over to the Operations and Checkout Building in KSC's Industrial Area; on November 1, 2012, NASA officially vacated the E&O Building.⁶⁴

⁶⁴ Jones Edmonds & Associates, Inc., "Rehabilitate Building E&O;" NASA KSC, "Building 60650."

Part II. Structural/Design Information

A. General Statement:

1. Architectural Character: The E&O Building is a two-story masonry structure with approximately 36,488 square feet of space. Its longitudinal axis is oriented about 35 degrees east of due north; for ease of reference, the description will assume the longitudinal axis follows true north. The walls are comprised of concrete block and are topped with a flat, built-up roof. It is rectangular in plan and the interior room arrangement is based on a double-loaded corridor layout. It is comprised of a South Wing (original) and a North Wing (addition) (Figure No. A-1).

2. Condition of fabric: At the time of documentation, the E&O Building was vacant, although the fabric remained in good condition due to previous periodic maintenance.

B. Description of Exterior:

1. Overall dimensions: The E&O Building (Photo Nos. 1-10) has approximate overall measurements of 395' in length (north-south), 45'-6" in width (east-west), and 25' in height. The structure is rectangular in plan.

2. Foundation: The foundations of the E&O Building are comprised of a 4"-thick steel reinforced poured concrete slab on compacted fill with steel reinforced poured concrete footers.

3. Walls: The exterior walls of the E&O Building are comprised of reinforced concrete columns and beams with concrete block infill. In general, the east and west elevations (Photo Nos. 1 and 7, respectively) of the building are divided into twenty-five 14'-8"-wide bays by 1"-wide/1'-deep, beige-painted concrete pilasters; a 3'-wide pilaster denotes where the original South Wing meets the North Wing addition. The south and north elevations (Photo Nos. 5 and 9, respectively) are divided into two 21'-4"-wide bays by 1"-wide/1'-deep pilasters.

4. Structural system, framing: The structural framing system of the E&O Building is comprised of concrete blocks and joists and steel beams.

5. Porches, patios, stoops: There is a 31'-wide by 8'-deep inset porch on the east elevation, which contains the main entrance (Photo No. 11). The porch features two concrete steps to the south and an L-shaped access ramp to the north. The other first floor entrances to the E&O Building feature either a small concrete stoop or an access ramp.

7. Openings:

- a. Doorways and doors:** The main entrance to the E&O Building is located on the east elevation (Photo Nos. 1, 11). It features a single one-light metal swing door that can be operated manually or electronically. The door is surrounded by plate glass windows.⁶⁵ There are no additional doorways on the east elevation and none on the north elevation. The south elevation features two sets of double one-light metal swing doors, one at the first floor level and one at the second floor level. The doorway on the second floor is accessed by a set of metal steps and is shaded by a small metal canopy. There are six doorways on the west elevation, five at the first floor level and one at the second floor level. The doorways on the first floor include one set of double metal swing doors, two single one-light metal swing doors, and two sets of double louvered metal swing doors. The doorway at the second floor is a single one-light metal swing door accessed by a set of metal steps.
- b. Windows:** With the exception of those around the main entrance, the majority of windows on the east and west elevations of the E&O Building are comprised of 7-3/4"-square glass blocks arranged in three rows with six to eighteen columns. The west elevation also features a few two-light windows, with a fixed top pane and awning lower pane. All of the windows have precast concrete sills.

8. Roof:

- a. Shape, covering:** The E&O Building has a flat roof faced with five-ply built-up roofing over lightweight concrete insulation. The entirety is supported by steel beams and concrete joists.

C. Description of Interior:

- 1. Floor plans:** The E&O Building is comprised of two floors, both of which feature a double-loaded corridor room arrangement. Most of the rooms have undergone some type of modification, typically in the form of new room finishes, partitioning into smaller spaces, or combining with others to form large spaces.

On the first floor, nearly centered within the South Wing and to the east of the main corridor, is the roughly 23' x 17' entrance lobby (Photo No. 12). This space features a carpeted floor and acoustic tile ceiling; the south wall contains fire alarm equipment. A wood screen in the south part of the western perimeter partially shields the lobby from the main corridor. Across the corridor from the lobby is the main staircase (Photo No. 26)

⁶⁵ This entrance replaced the original, which consisted of two sets of double one-light metal swing doors circa 1999. Jones Edmonds & Associates, Inc., "Building E&O."

and elevator; to the south of the lobby are various offices. Directly to the north of the lobby, on the east side of the corridor, are three offices followed by the main conference room. The conference room (Photo Nos. 13, 14, 15) measures approximately 64' x 22'. It features fabric acoustic wall panels on the east, south, and west walls; a raised platform at the south end; and a white board/projection screen on the south wall. Additionally, the northern 16' can be closed-off by a foldable partition. On the west side of the corridor, across from the conference room, was the E&O Building branch of the KSC Federal Credit Union (Photo No. 16). This 60' x 15' space contained a teller area, two smaller offices, and a break room. The North Wing mostly contained office areas, including a large space with removable partitions (Photo No. 24), the Division Chief's office (Photo No. 17), and various individual offices. At the north end was a documents library, a computer lab, and support areas (Photo Nos. 18, 19).

Across from the main staircase on the second floor of the South Wing is a group of three rooms, which were designed for the ELV Program Director (south, Room No. 2006), the ELV Deputy Director (north, Room No. 2106), and an administrative assistant (middle, Room No. 2004).⁶⁶ Room No. 2006 (Photo No. 20) measured 22' x 15', and featured wood wainscoting on the walls. At the northeast corner was a small, wood-paneled projection that contained a whiteboard and a small storage space. A door on the west wall opened onto the corridor, and a door on the north wall provided direct access to Room No. 2004, which measured roughly 17' x 15'. Room No. 2106 (Photo No. 21) also had approximate dimensions of 17' x 15'. It had a small section of wood wainscoting on the east wall, a door on the west wall that led to the corridor, and a door on the south wall for direct access to Room No. 2004. The remainder of the second floor contained office spaces; most were for single occupants (Photo No. 22) although a few were larger in size with removable partitions (Photo Nos. 23, 24).

3. **Flooring:** The flooring throughout the E&O Building is a combination of different materials applied to the concrete slab. In general, the offices and corridors have carpeting, while the restrooms and equipment rooms have either concrete or ceramic tile floors.
4. **Wall and ceiling finishes:** Most of the interior wall finishes throughout the E&O Building are painted gypsum board. The Program Director's office also features wood panel wainscoting and a wood panel case for a white board and storage area. The main portion of the conference room (Room No. 1118) has fabric-clad acoustic panels on its east, west, and south walls. Also, the outer walls in some of the office areas are exposed concrete block. The ceiling finishes throughout the E&O Building include acoustic ceiling tile and painted gypsum board.

⁶⁶ Jones Edmonds & Associates, Inc., "Rehabilitate Building E&O."

5. Openings:

- a. **Doorways and doors:** According to the various drawings, there are roughly 105 interior doors in the E&O Building, nearly all of which are constructed of wood and feature metal surrounds. Of these, approximately 95 percent are single swing doors and 5 percent are double swing doors.
- b. **Windows:** Most of the windows in the E&O Building are comprised of glass block and are flush with the internal wall surface. The few non-glass block windows have a 4" sill.

8. Mechanical equipment:

- a. **Heating, air conditioning, ventilation:** The E&O Building contains a central heating, ventilating, and air conditioning system.
- b. **Lighting:** The E&O Building contains surface-mounted and recessed fluorescent light fixtures throughout all rooms and corridors.
- c. **Plumbing:** The E&O Building features an indoor plumbing system with separate pumps for hot and cold water.
- d. **Electrical:** The E&O Building has an electrical system that powers all of the lighting, power outlets, communications systems, and plumbing/mechanical equipment.

D. Site:

- 1. **Historic landscape design:** The original E&O Building had trees at the northeast and southeast corners of the building, and small shrubs along the length of the east and south elevations; the north addition to the facility did not receive similar vegetation. To the east of the building were a one-way entrance drive (south to north) and a forty-three space directional parking lot, which extended to where the north elevation of the addition would be placed. An L-shaped paved drainage pit was situated to the west. Parking lots also were located to the north, west, and south of the building, which provided additional parking for those employees stationed in the E&O Building and those housed in Hangar AE to the west and Hangar S to the southwest (Figure A-7).

At the time of documentation, shrubs and palm trees continued to line the east and south additions of the E&O Building. The east drive and parking lot had been modified to a north to south orientation. In addition, the north, west, and south parking lots, as well as Hangar AE and Hanger S, remained extant.

Part III. Sources of Information

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APPENDIX A: Historic Photos of the Engineering & Operations Building

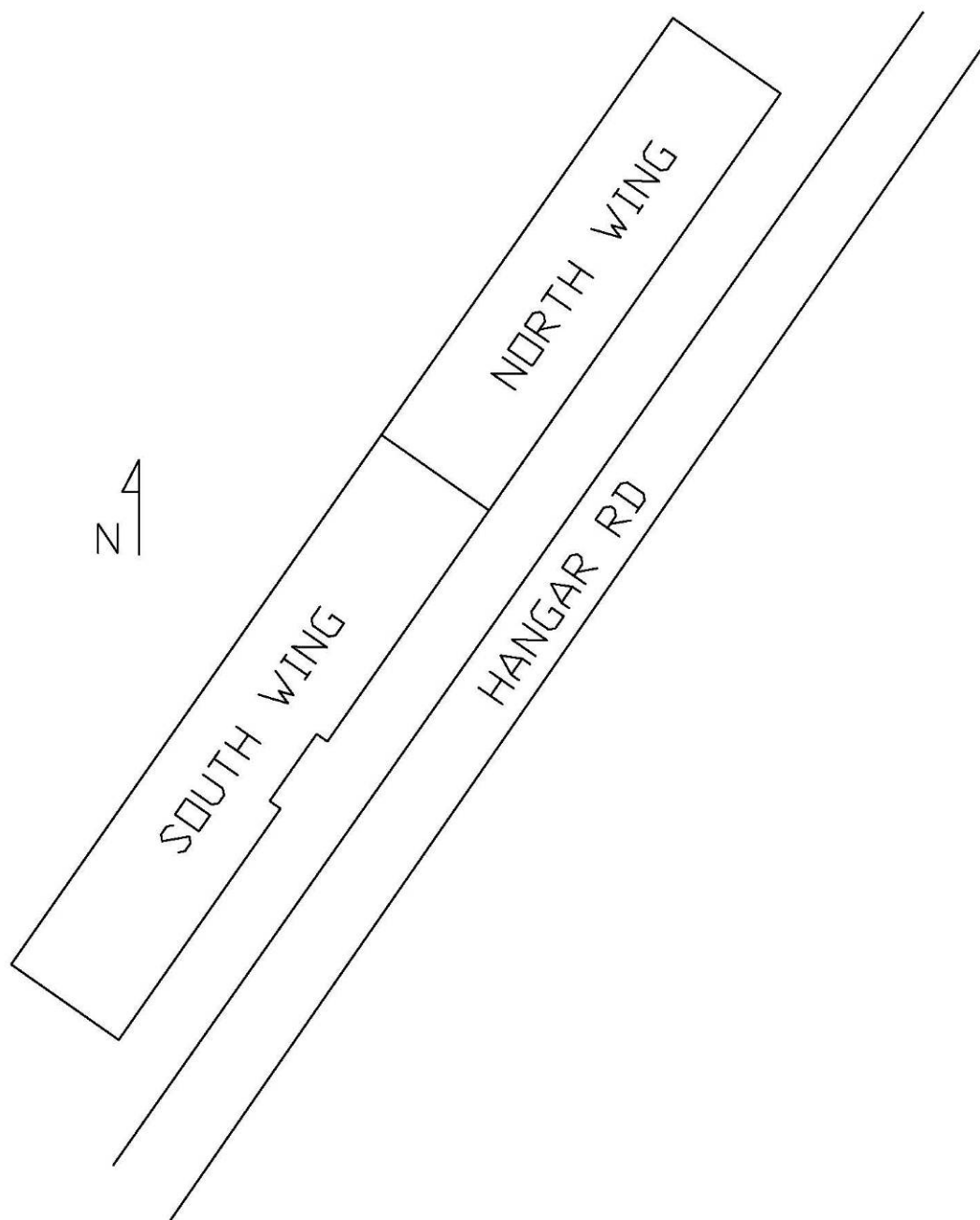


Figure A-1. Line diagram of the E&O Building.



Figure A-2. Construction work on the E&O Building, February 1, 1961.
Source: John F. Kennedy Space Center Archives, LOD-61-948.



Figure A-3. View of the E&O Building, April 10, 1961.
Source: John F. Kennedy Space Center Archives, LOD-61-3620.



Figure A-4. Construction materials for the North Wing addition to the E&O Building,
January 25, 1963.

Source: John F. Kennedy Space Center Archives, LOC-63-569.



Figure A-5. View of the construction of the North Wing addition to the E&O Building,
April 2, 1963.

Source: John F. Kennedy Space Center Archives, LOC-63-3333.



Figure A-6. View of E&O Building with completed North Wing addition, May 17, 1963.
Source: John F. Kennedy Space Center Archives, LOC-63-4892.



Figure A-7. Aerial view of the CCAFS Industrial Area, December 2, 1981.
E&O Building denoted with arrow.
Source: John F. Kennedy Space Center Archives, 116-KSC-381C-3323_3.

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APPENDIX B: Architectural Drawings of the Engineering & Operations Building
(PDF Scans of each Drawing at the original size are located within the Field Notes)

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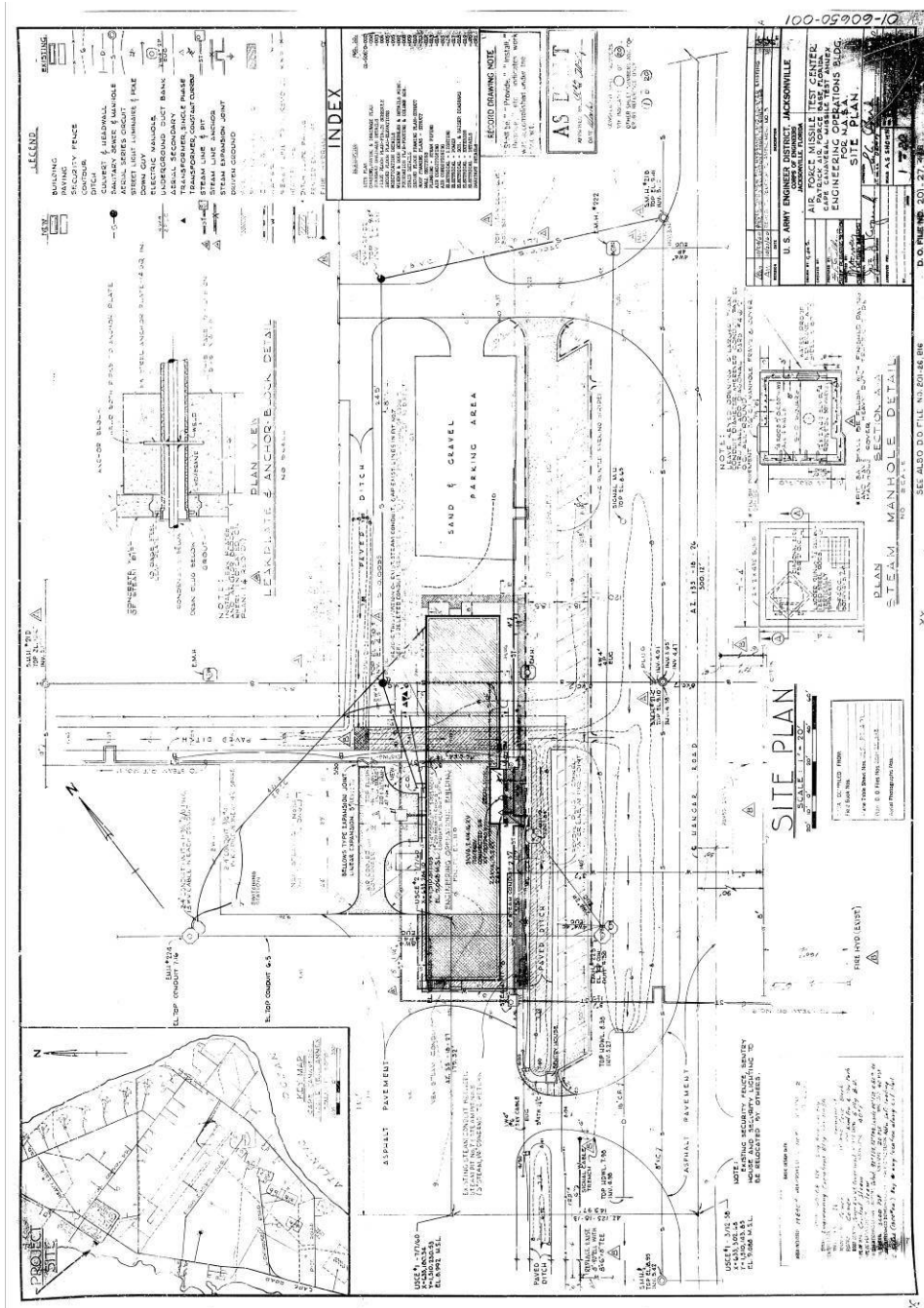


Figure B-1. ACOE, Engineering Operations Building for NASA, Site Plan, October 1960, Sheet 1 of 20.

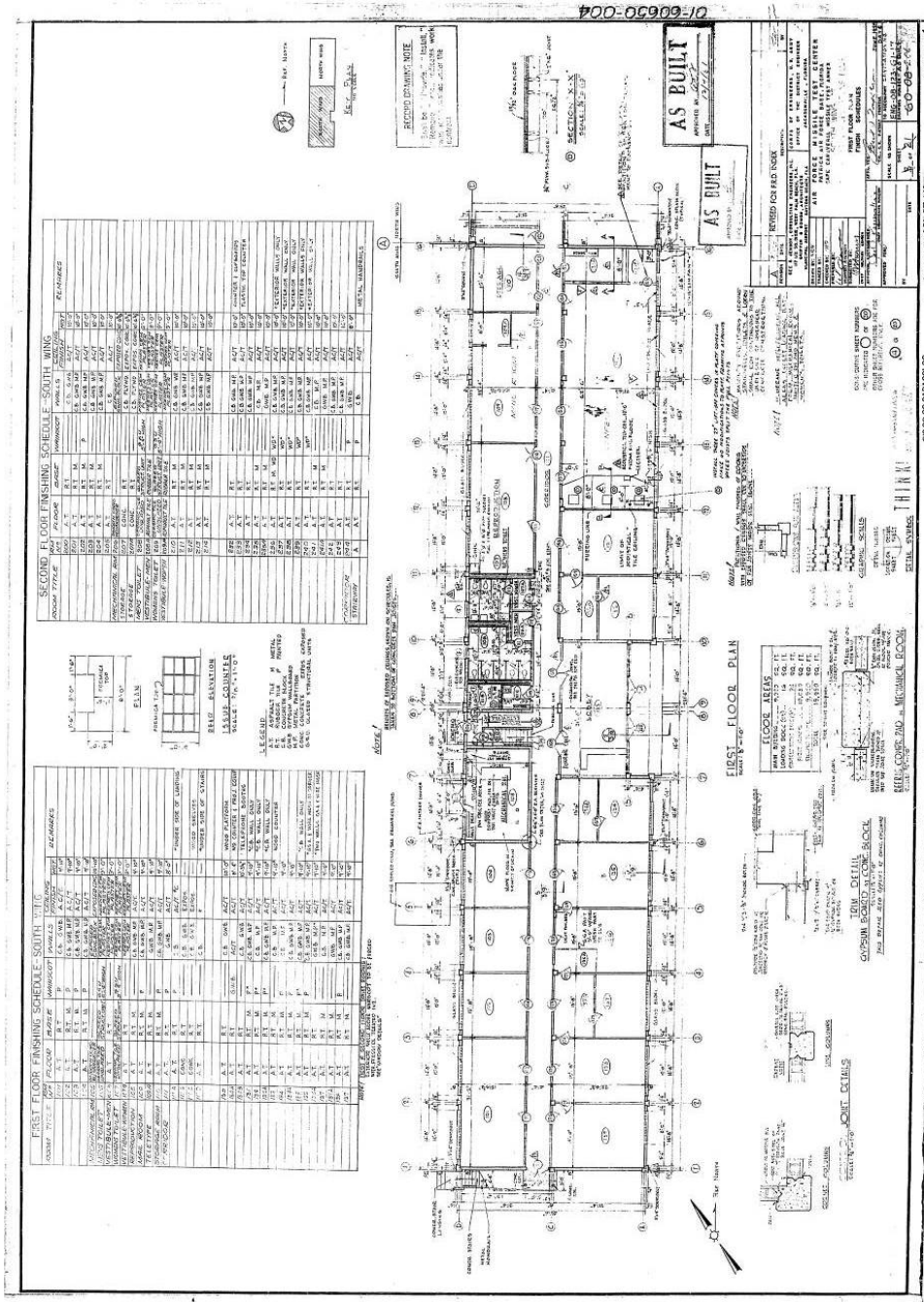


Figure B-2. Griffin & Gomon, South Wing of the Engineering & Operations Building, First Floor Plan/Finish Schedules, June 1958, Sheet 4.

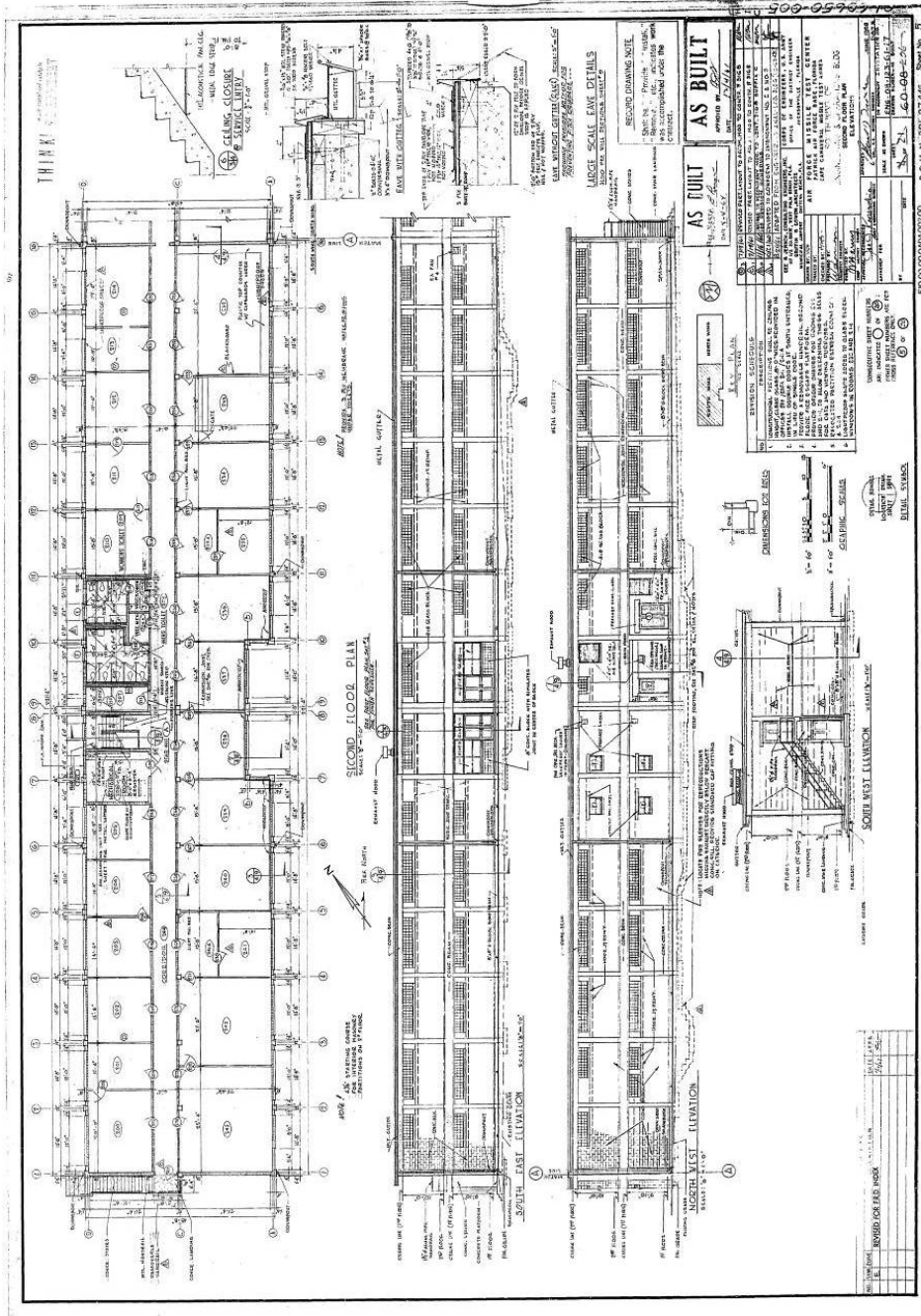


Figure B-3. Griffin & Gomon, South Wing of the Engineering & Operations Building, Second Floor Plan/Elevations, June 1958, Sheet 5.

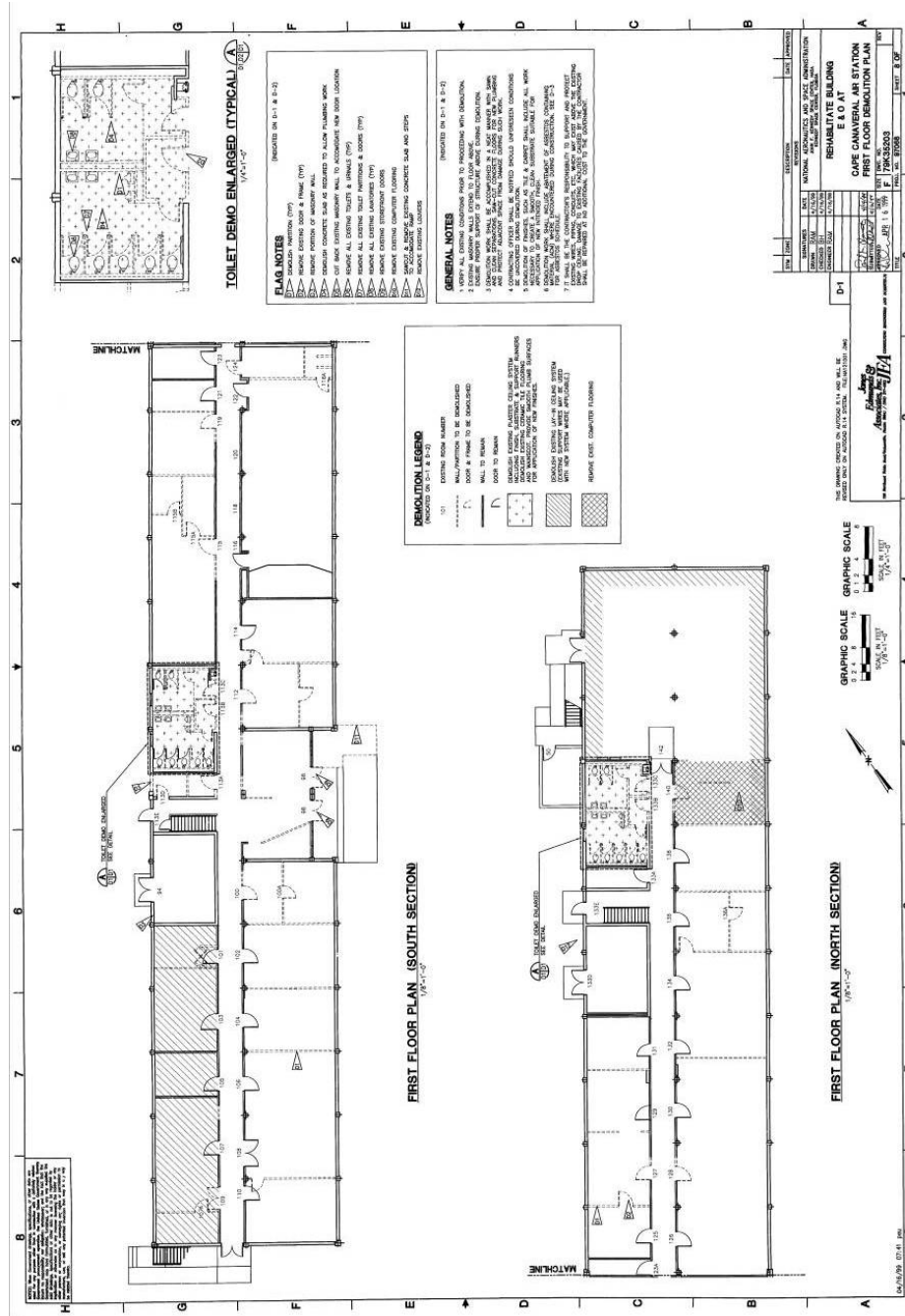


Figure B-7. Jones, Edmunds & Assoc., Rehabilitate Building E&O at Cape Canaveral Air Station, First Floor Demolition Plan, April 1999, Sheet 8.

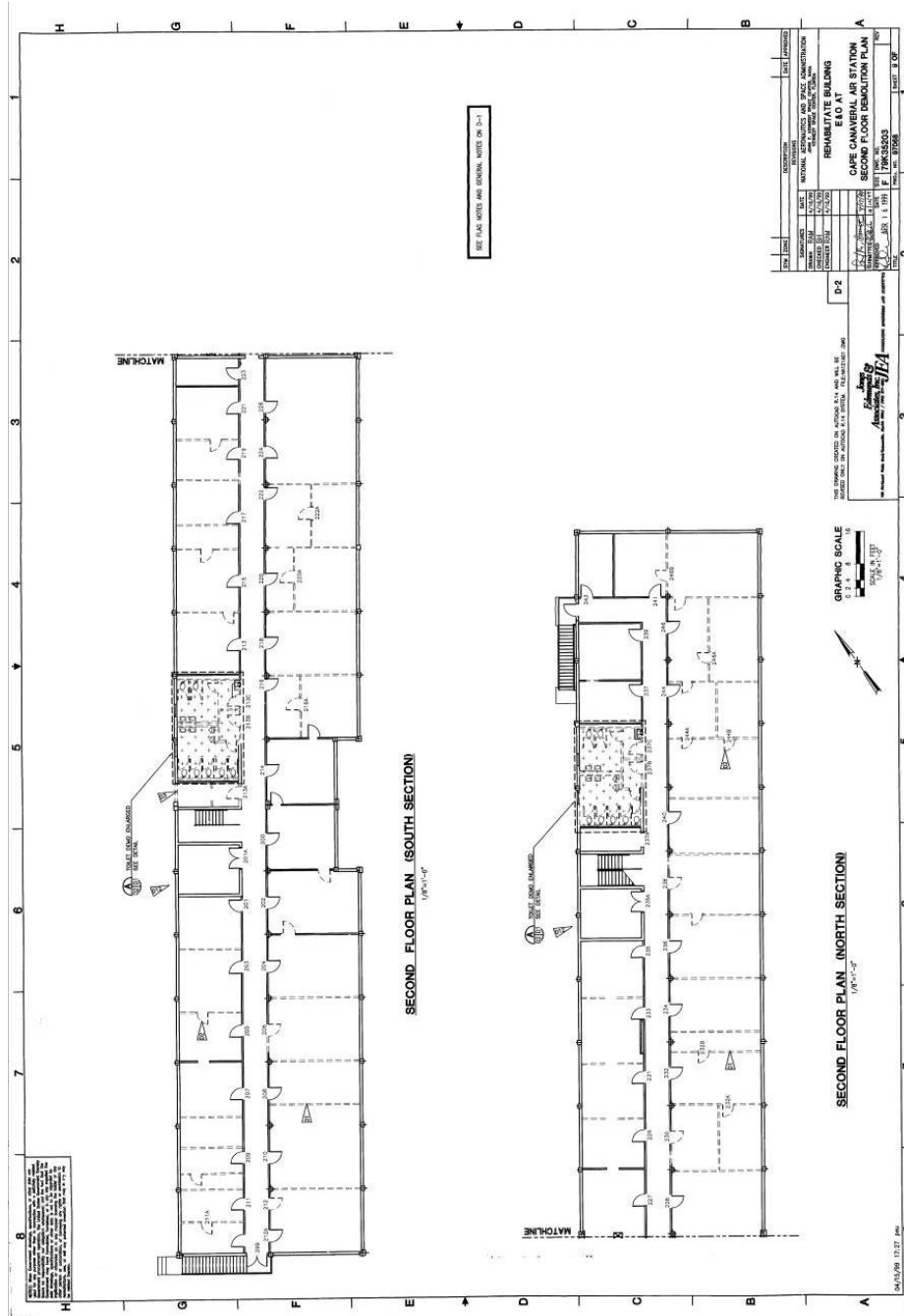


Figure B-8. Jones, Edmunds & Assoc., Rehabilitate Building E&O at Cape Canaveral Air Station, Second Floor Demolition Plan, April 1999, Sheet 9.

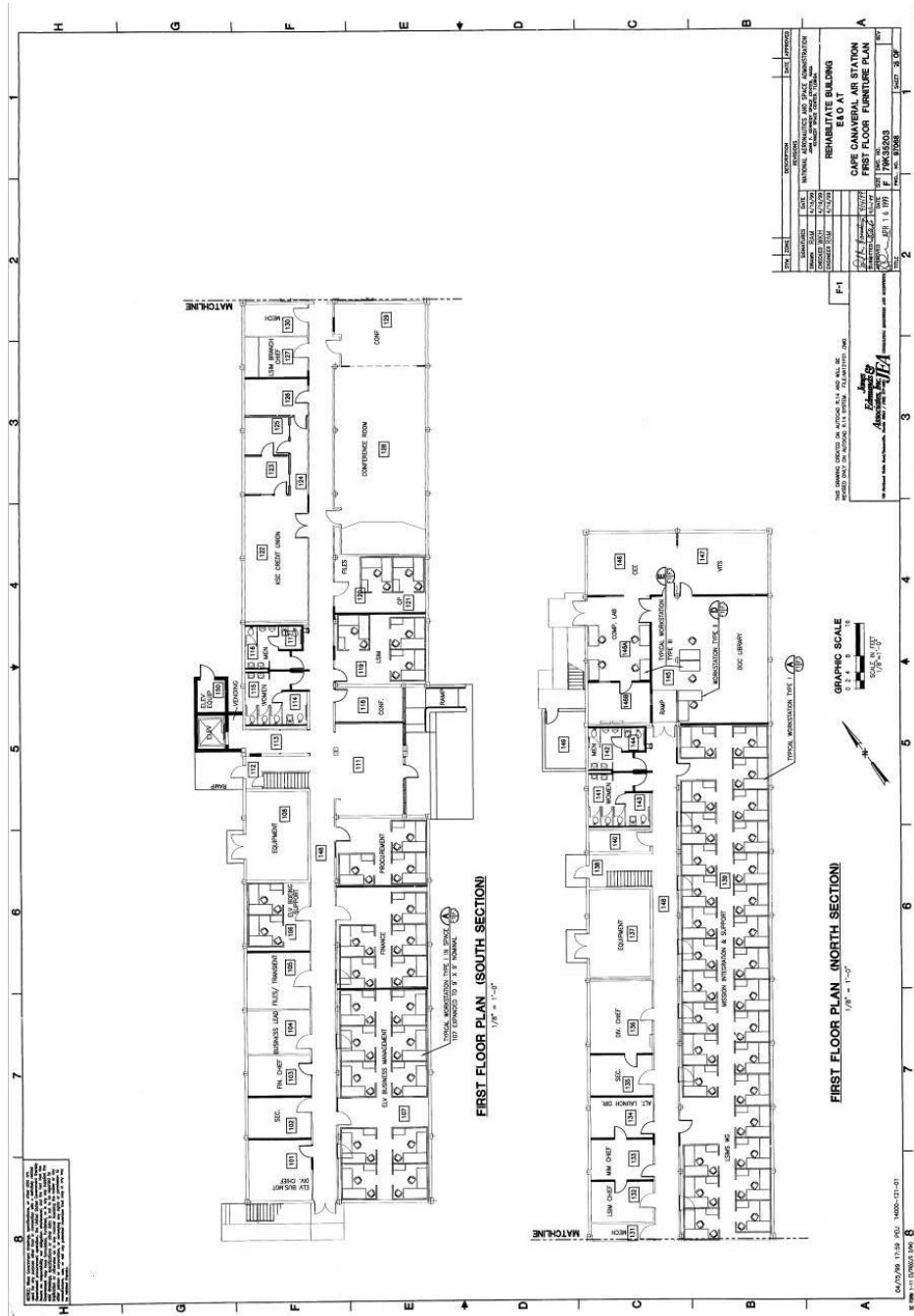


Figure B-11. Jones, Edmunds & Assoc., Rehabilitate Building E&O at Cape Canaveral Air Station, First Floor Furniture Plan, April 1999, Sheet 15.

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Penny Rogo, Photographer; September 2013

- FL-583-C-1 OVERALL VIEW OF THE EAST ELEVATION, FACING NORTHWEST.
- FL-583-C-2 OVERALL VIEW OF THE SOUTH HALF OF THE EAST ELEVATION,
FACING NORTHWEST.
- FL-583-C-3 OVERALL VIEW OF THE NORTH HALF OF THE EAST ELEVATION,
FACING NORTHWEST.
- FL-583-C-4 OVERALL VIEW OF THE EAST AND SOUTH ELEVATIONS, FACING
NORTH.
- FL-583-C-5 OVERALL VIEW OF THE SOUTH ELEVATION, FACING NORTHEAST.
- FL-583-C-6 OVERALL VIEW OF THE SOUTH AND WEST ELEVATIONS, FACING
NORTHEAST.
- FL-583-C-7 OVERALL VIEW OF THE WEST ELEVATION, FACING SOUTHEAST.
- FL-583-C-8 OVERALL VIEW OF THE WEST AND NORTH ELEVATIONS, FACING
SOUTH.
- FL-583-C-9 OVERALL VIEW OF THE NORTH ELEVATION, FACING
SOUTHWEST.
- FL-583-C-10 OVERALL VIEW OF THE NORTH AND EAST ELEVATIONS, FACING
SOUTHWEST.
- FL-583-C-11 DETAIL VIEW OF THE MAIN ENTRANCE ON THE EAST ELEVATION,
FACING NORTHWEST.
- FL-583-C-12 OVERALL VIEW OF THE ENTRANCE LOBBY, FACING SOUTHWEST.
- FL-583-C-13 OVERALL VIEW OF THE CONFERENCE ROOM (ROOM NOS.
1118/1132), FACING NORTHEAST.

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- FL-583-C-15 DETAIL VIEW OF THE CONFERENCE ROOM (ROOM NO. 1153) DOOR, FACING SOUTHEAST.
- FL-583-C-16 OVERALL VIEW OF THE ENGINEERING & OPERATIONS BUILDING BRANCH OF THE KSC FEDERAL CREDIT UNION (ROOM NO. 1117), FACING SOUTHWEST.
- FL-583-C-17 OVERALL VIEW OF ROOM NO. 1153, FACING SOUTHWEST.
- FL-583-C-18 OVERALL VIEW OF COMPUTER LAB (ROOM NO. 1181), VITS ROOM (ROOM NO. 1184), AND DOCUMENTS LIBRARY (ROOM NO. 1174), FACING EAST.
- FL-583-C-19 DETAIL VIEW OF CABINETS IN DOCUMENTS LIBRARY (ROOM NO. 1174), FACING NORTHEAST.
- FL-583-C-20 OVERALL VIEW OF THE EXPENDABLE LAUNCH VEHICLE PROGRAM DIRECTOR'S OFFICE (ROOM NO. 2006), FACING NORTH.
- FL-583-C-21 OVERALL VIEW OF THE EXPENDABLE LAUNCH VEHICLE PROGRAM DEPUTY DIRECTOR'S OFFICE (ROOM NO. 2106), FACING SOUTH.
- FL-583-C-22 OVERALL VIEW OF A TYPICAL INDIVIDUAL OFFICE SPACE (ROOM NO. 2011), FACING NORTHWEST.
- FL-583-C-23 OVERALL VIEW OF A MEDIUM-SIZE OFFICE AREA (MISSION ANALYSIS, SECOND FLOOR), FACING NORTH.
- FL-583-C-24 OVERALL VIEW OF A TYPICAL LARGE OFFICE AREA (MISSION INTEGRATION & SUPPORT, FIRST FLOOR), FACING SOUTHWEST.
- FL-583-C-25 OVERALL VIEW OF THE FIRST FLOOR CORRIDOR, FACING SOUTHWEST.
- FL-583-C-26 DETAIL VIEW OF THE MAIN STAIRCASE ACROSS FROM THE ENTRANCE LOBBY, FACING NORTH.