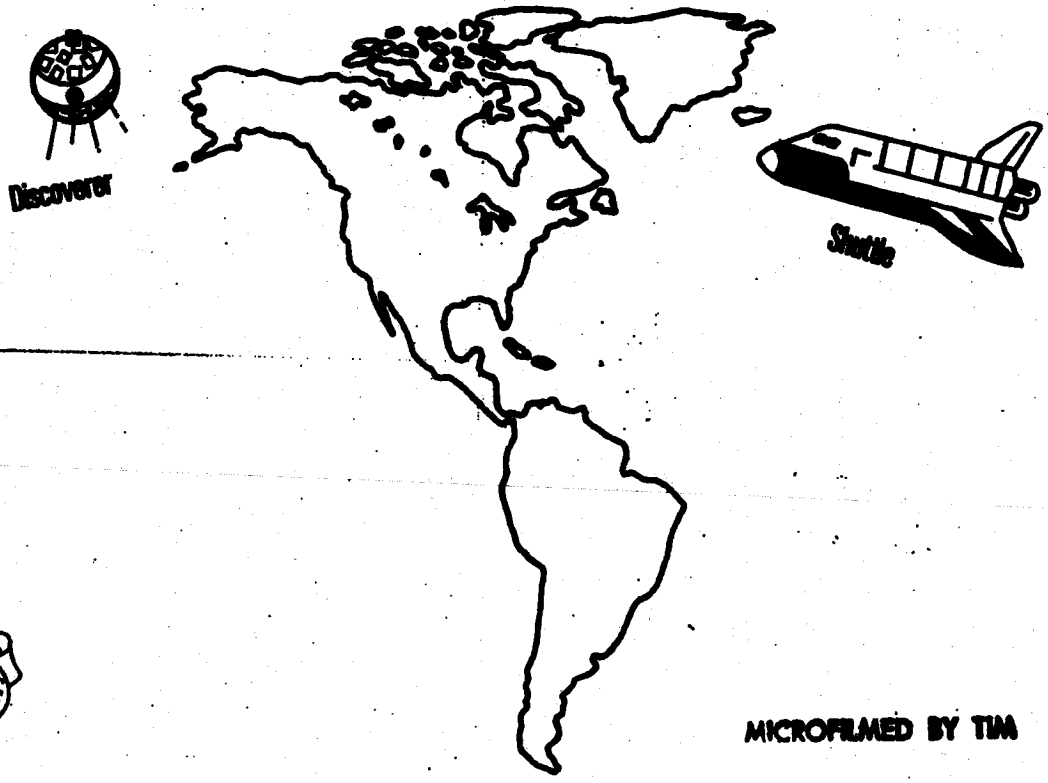
AIR FORCE SATELLITE CONTROL FACILITY

HISTORICAL BRIEF AND CHRONOLOGY
1954 - PRESENT



Prepared by

MSgt Roger A. Jernigan
AFSCF History Office

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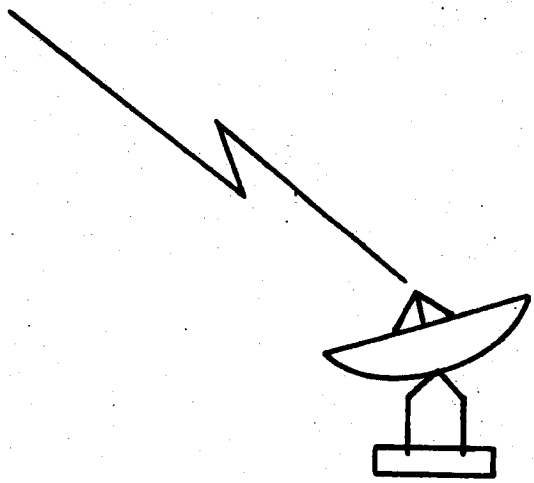

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FOREWORD

This expanded historical brief and chronology of the Air Force Satellite Control Facility is the first ever to be published. Initial publication and distribution is timed to coincide with the 35th anniversary observance of the U.S. Air Force during 1982. The "space age" is now nearly as old, dating to 1957 and the launch of Sputnik I by the Soviet Union.

The rudiments of that space age may be traced even deeper into the past to 1926. In that year, Robert Goddard, "father of American rocketry," designed the first liquid-propellent rocket which was launched to an altitude of 41 feet. Although he continued to design rockets through the 1930's, he was somewhat ignored in his own country, but his work was not disregarded in Germany.

In 1932, a 20 year-old German physicist was placed in charge of a rocket-development center south of Berlin. Later, he and his engineering team moved to a new center at Peenemuende, on the Baltic coast, where they developed the renowned V-2 rocket. The physicist was Wernher von Braun.

He and more than 100 colleagues surrendered to American troops in 1945. Two decades later, working for NASA, von Braun developed Saturn rockets which overcame the Soviet Union's early lead in space and put Americans on the moon.

Most of the publicity in the 1960's regarding the U.S. space program was devoted, and deservedly so, to manned space missions. The advances in satellite technology and applications were less well known except to those persons directly involved. This historical brief and chronology relate the story of the AFSCF. Manned space events are included since most received AFSCF support. Annual updates will be sent to all recipients of this publication.

This document was compiled from materials and information found in the official histories and archives of the AFSCF. It is dedicated to all those professionals who have served or are currently serving at Sunnyvale and SCF worldwide locations. For more details regarding separate events reported in this document, please visit your AFSCF History Office.

ROGER A. JERNIGAN, MSgt, USAF
AFSCF Historian

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6594TH TEST WING
and
AIR FORCE SATELLITE CONTROL FACILITY (AFSCF)

Air Force Ballistic Missile Division (AFBMD), of the Air Research and Development Command (ARDC), activated a field office at the Lockheed Missile and Space Division Facility, Palo Alto, California, effective 15 Aug 58.	AFMB Ops Ord 2-58, 1 Aug 58	Field Office responsible for Program IIA (Thor aspects of WS 117L), and development and testing to achieve early orbital capability with Thor booster plus assist Man-in-Space program.
Hq 6594th Test Wing designated and organized at Palo Alto Lockheed Facility, eff 2 Apr 59. Assigned to ARDC with administrative and operational control exercised by Det 2, ARDC.	ARDC GO 38, 3 Apr 59	First military unit charged with military satellite operations. Interim satellite control facility had been established in Jan 59 for supporting Midas, Samos, and Discoverer programs.
AFBMD disestablished Palo Alto Field Office and transferred all personnel to Hq 6594th Test Wing, eff 1 Jun 59.	AFMB Ltr, 22 Jun 59	Consolidated Field Office and satellite control center with the new wing.
ARDC reassigned Hq 6594th Test Wing from Hq ARDC to Hq AFBMD eff 15 Nov 59.	ARDC GO 231, 13 Nov 59	No change in station for 6594th Test Wing. AFBMD activated in Los Angeles as part of ARDC reorganization.
ARDC redesignated 6594th Test Wing as Hq 6594th Test Wing (Satellite) with no change in station or assignment.	ARDC SO 2, 4 Jan 60	Test Wing acquired a more descriptive designation.
Hq 6594th Test Wing (Sat) moved from Palo Alto to Lockheed Missile and Space Division Facility, Sunnyvale, California, 1 Mar 60.	Hist, 6594th Test Wing (Sat), 1 Jul-31 Dec 60, p 1.	Acquired added space for Test Wing facilities. At AFBMD, a satellite control office was established and a command and control contract was issued to Lockheed thus seperating the satellite control function as an entity rather than as part of one or more general contracts being handled by AFBMD.

ARDC order formally announced movement of 6594th Test Wing (Satellite) to Sunnyvale, 1 Apr 60.	ARDC GO 74, 7 Jul 60	
6594th Test Wing (Sat) reassigned from AFBMD to Space Systems Division (SSD), Air Force Systems Command (AFSC), formerly ARDC, eff 1 Apr 61.	AFSC GO 3, 1 Apr 61	Air Force reorganization which formed three new commands, including AFSC.
AFSC redesignated the 6594th Test Wing (Satellite) as the 6594th Aerospace Test Wing, eff 1 Nov 61.	AFSC SO G-174, 25 Oct 61	No change in station or personnel; redesignation made concurrently with similar actions pertaining to test wings at Patrick and Vandenberg AFB's.
AFSCF designated and organized with Hq at Los Angeles and assignment to SSD. Det 1, AFSCF, designated and organized together with 6594th Air Base Squadron at Sunnyvale. 6594th Aerospace Test Wing discontinued, eff 1 Jul 65.	AFSC SO G-52, 21 Jun 65	AFSC approved "Satellite Control Facility" as the designation of the new organization created from a merger of SSD's Deputy for Space Test Operations and the 6594th Aerospace Test Wing. Created "more flexible, efficient, organization capable of performing all satellite control functions.
AFSCF reassigned from SSD to new Space and Missile Systems Organization (SAMSO), eff 1 Jul 67.	AFSC SO G-55	SAMSO formed by merging Space Systems Division and Ballistic Systems Division.
Det 1, Sunnyvale, inactivated with personnel and functions reassigned to Hq AFSCF, eff 1 Jul 77.	AFSC SO G-58, 3 May 77	Hq AFSCF relocated from Los Angeles to Sunnyvale and the Satellite Test Center. Move completed on or about 8 July. (AFSC Movement Order 1, 16 Mar 77)
AFSCF's parent organization, SAMSO, redesignated as Space Division (SD), eff 1 Oct 79.	Secretary of the Air Force announcement, Sep 79; AFSC SO G-145, 18 Sep 79	Air Force realignment of space and missile systems research, development, and acquisition elements.

Historical Brief

THE EVOLUTION OF THE AIR FORCE SATELLITE CONTROL FACILITY

Ballistic Missile Development (1954 - 1965)

The Air Force Satellite Control Facility (AFSCF), Sunnyvale Air Force Station California, traces its origin to the Air Force ballistic missile development program and establishment of a west coast field office to manage the nation's first intercontinental ballistic missile, the Atlas.

On 1 July 1954, the Air Research and Development Command (ARDC) activated the Western Development Division (WDD) in southern California. The WDD was charged with accelerating the development of the Atlas missile. Under the command of Brigadier General Bernard A. Schriever, the WDD made many advances in the Atlas program during the next year, and by the end of 1955, the division was given additional tasks, e.g., developing an intermediate range ballistic missile (Thor), and achieving initial operating capability (IOC) with the missile systems it was building. Early program urgency lessoned in early 1956 and 1957 as the Eisenhower administration made large cuts in defense spending to balance its budget.

On 1 June 1957, the WDD was redesignated as the Air Force Ballistic Missile Division (AFBMD), and on 20 September, the first successful Thor IRBM was launched from Cape Canaveral, Florida. The first successful Atlas launch followed with a short-range flight on 17 December.

Sputnik and Weapon System 117L

Between the initial Thor and Atlas launches, the Soviet Union used an ICBM to place the world's first man-made satellite, Sputnik I, into earth orbit on 4 October 1957. The impact of that event on the Air Force missile and emerging space programs was immediate. Both gathered momentum as funding increased and previous program priorities were reinstated.

One of the early space projects——a portion of which is the antecedent of our present AFSCF——was Weapon System 117L, an advanced military satellite system. Previously, on 29 October 1956, Lockheed Missile Systems Division had been designated as primary contractor for the 117L system and its associated Agena upper stage vehicle. Most of the required electronics were then subcontracted to Philco Ford in 1957. That year indeed marked the entry of the world into the space age, and the U.S. space program was accelerated "at the maximum rate consistent with good management."

Within days of the Sputnik launch, an Air Force Scientific Advisory Board, Ad Hoc Committee on Advanced Weapons Technology and Environment, urged the development of second generation ballistic missiles for use as weapon systems and space boosters. High priorities were established for development of military satellite systems for communications, weather prediction, and other purposes. The committee also recommended that the AFBMD become a permanent organization for missile and space satellite projects. To that end, both the Thor and Atlas were recommended as basic

satellite booster systems eventually serving as the backbone of U.S. space programs through the late 1970's using a wide variety of upper stages (Agena, Delta, Centaur, Burner II), supporting manned and unmanned space projects of the Air Force and the National Aeronautics and Space Administration (NASA).

Palo Alto Field Office

In 1957, General Thomas D. White, Air Force Chief of Staff, announced the transfer of ballistic missile operational programs, IOC facilities, and planning from AFBMD to the Strategic Air Command in a move to speed the ballistic missile operational capability. Shortly thereafter, on 7 February 1958, Secretary of Defense Neil H. McElroy activated the Advanced Research Projects Agency (ARPA) for the management of all Department of Defense (DOD) space programs during their research and development phases. At this time the original program plan for WS 117L called for launches from Cape Canaveral supported by tracking facilities at that location, the Grand Bahamas, Ascension, and Hawaii. In March 1958 that program turned to the Western Test Range where added tracking support was available, particularly for the Discoverer program, through Vandenberg AFB, California; Point Mugu, California; Kaena Point, Hawaii; and Kodiak, Alaska. Thus, the SCF's predecessor evolved from a two-station network for supporting WS 117L to a five-station Discoverer program support capable network. The system now included Very Long Range Tracking (verlort) radars for tracking and commanding, and a VHF, FM/FM system for telemetry. The initial data system capable of supporting a digital antenna system and relatively simple payload

was developed at the Vandenberg Tracking Station. Analysis of then present and future data handling requirements in early 1958 yielded a system consisting of Programmable Integrated Control Equipment (PICE) working in conjunction with a CDC 1604 computer. The PICE/1604 system was then installed at VTS, NHS, and the STC. Responsibility for WS 117L was transferred from AFBMD to ARPA on 30 June. Development and testing for WS 117L continued to be the responsibility of the AFBMD, and on 15 August 1958, a field office was activated in Palo Alto, California, with 20 personnel assigned. Its mission was to achieve an early orbital capability with the Thor and to support an Aero-biomedical program designed to assist in the development of our man-in-space program. In that same month, Headquarters ARDC organized the 6593rd Test Squadron (Special) at Hickam AFB, Hawaii. That squadron was the forerunner of today's 6594th Test Group assigned to the AFSCF and stationed in Hawaii.

Early Operational Support

Lockheed completed an interim satellite control center in Palo Alto in January 1959. During the launch of Discoverer I on 28 February, the interim facility received a total of 514 seconds of telemetry from the world's first polar orbiting satellite. That mission was the first to use a Thor as a space booster and it also represented the first successful flight test of Lockheed's Agena A upper stage vehicle designed for orbiting U.S. satellite systems. On 6 April 1959, Headquarters ARDC established the first military unit to be charged with conducting military satellite operations -- the 6594th Test Wing. With its headquarters at the Lockheed, Palo Alto location and eight subordinate units, the new organization possessed 2,704 validated manning spaces. Three operating locations were assigned -- Edwards AFB (OL-1);

Chiniak, Alaska (OL-2); and Annette Island, Alaska (OL-3). In June the AFBMD field office was disestablished and its personnel were transferred to the new wing. In addition, the 6593rd Test Squadron (Special) was reassigned to the new organization. By the end of 1959, the Vandenberg, Hawaii, and New Hampshire Tracking Stations had joined the wing along with the 6594th Recovery Control Group to which the 6593rd was reassigned. Also in late 1959, an overall reorganization and decentralization of ARDC transpired. Headquarters AFBMD was constituted and activated at Los Angeles, California. During the reorganization process, the 6594th Test Wing at Palo Alto was reassigned from Hq ARDC to Headquarters AFBMD effective 15 November. After a DOD decision led to reassignment of all Defense Department satellite and space vehicle programs to the military services having primary interest, the Discoverer, MIDAS, and SAMOS programs were approved for transfer back to AFBMD from ARPA. All three of those programs were originally part of the WS 117L program which AFBMD had managed from its inception until 1958 when ARPA assumed responsibility.

Sunnyvale

On 15 January 1960, ARDC redesignated Headquarters 6594th Test Wing as Headquarters 6594th Test Wing (Satellite). On 1 March the 6594th moved from Palo Alto to Sunnyvale where an interim control center was established in the Lockheed complex. By the end of June, the Satellite Test Center (STC) was activated on a portion of 11.4 acres of land purchased by the Air Force in the southeast corner of the Lockheed area.

The 6594th Test Wing (Satellite) assumed initial responsibility for flight operations previously belonging to Lockheed as the primary contractor for WS 117L, and on 7 July 1960, the facilities located at Sunnyvale were officially designated as the "Satellite Test Annex (STA)," under the jurisdiction of AFBMD. In August the 6593rd Test Squadron (Special) achieved two important "firsts." On the 11th the squadron performed a surface recovery of a data capsule from Discoverer XIII in the Pacific Ocean near Hawaii. Although the planned mid-air recovery was not made, the event marked the first successful recovery of a man-made object ejected from an orbiting satellite. On 30 August, the unit's Captain Harold E. Mitchell flew a C-119J "Flying Boxcar" to the location of a descending Discoverer XIV capsule northwest of Hawaii and accomplished the first successful aerial recovery of an object returned from orbit. Notwithstanding the successful recovery with the C-119J aircraft, a development program was begun to convert to the more powerful C-130 aircraft and acquire helicopters for performing necessary water retrieval.

On 6 February 1961, the satellite control operations center was moved from its temporary location to a new satellite control room in Building 1001 where Lockheed personnel conducted the first multiple satellite operations for two Discoverer satellites on 17 and 18 February. Although the test wing assumed initial flight operations responsibility after the move to Sunnyvale, it was not until April 1961 that the wing became totally responsible for STA operations and for direct supervision of all technical and logistical support. Until then, Lockheed had actually operated the STA with the 6594th Test Wing (Satellite) acting as a monitor.

The assumption of total responsibility by the test wing came after a 1 April Air Force reorganization resulting in the formation of three new commands, including the Air Force Systems Command (AFSC). From the former ARDC and Air Materiel Command, a new Space Systems Division (SSD) was formed with responsibility for military space systems and boosters. The SSD was positioned under the Deputy Commander of AFSC for Aerospace Systems in Los Angeles. As part of the reorganization, the 6594th Test Wing (Satellite) at Sunnyvale was assigned to SSD. On 1 November 1961, the test wing was redesignated Headquarters 6594th Aerospace Test Wing while remaining assigned to SSD, predecessor of the Space and Missile Systems Organization (SAMSO), and today's Space Division (SD) at Los Angeles. By the end of 1961, the Flight Test Support element moved from Palo Alto to the STA where the central control room was capable of supporting up to three satellites simultaneously. All-computerized operations were a reality with addition of a second CDC 1604 computer system and other equipment installations completed in December.

SEQCM see note*

Early Advances

In 1962 the network consisted of the Satellite Test Annex at Sunnyvale and tracking stations at Vandenberg, Kodiak, Hawaii, New Boston, Thule, Annette Island, and Fort Greely, Alaska. No two stations were configured identically. A variety of telemetry, tracking and commanding (TT&C) systems existed to match the peculiar requirements of each of the more than 10 programs being supported.

The Multi-Satellite Augmentation (Augie) Program was developed and approved in order to simplify, standardize, and add capacity to the network for handling and processing the increasing workload. The so-called "augmented" communications consisted of links with the Kodiak, Point Mugu, New Boston, Thule, Vandenberg, and Kaena Point stations. Secure circuits were available to Annette Island, Vandenberg, Kodiak, Kaena Point, and New Boston, with an additional 100 word per minute circuit to Fort Monmouth. During 1962, 100 wpm full duplex secure circuits were installed and approved for passing information between the STA and its operating locations. On 10 October, the Deputy Commander for Aerospace Systems was inactivated at Los Angeles making the Space Systems Division and Ballistic Systems Division completely independent and reporting directly to Hq AFSC.

The Indian Ocean Station joined the network in August 1963 to support the first Vela satellite launch. Three other stations were also equipped with the TT&C systems required by Vela. Due to program reorientation, the Fort Greely station was placed in caretaker status in mid-year. Similarly, the Annette Island station was deleted and permanently discontinued. A new integrated TT&C system was conceived -- the Space-Ground Link Subsystem (SGLS).

The Single Manager Concept

Another turning point in the history of U.S. military space programs came on 20 November 1963. On that date the Defense Department announced that the Navy Missile Facility at Point Arguello, California, and the Navy tracking stations in the Pacific would be transferred to the Air Force which would become the single manager for ICBM and space tracking activities.

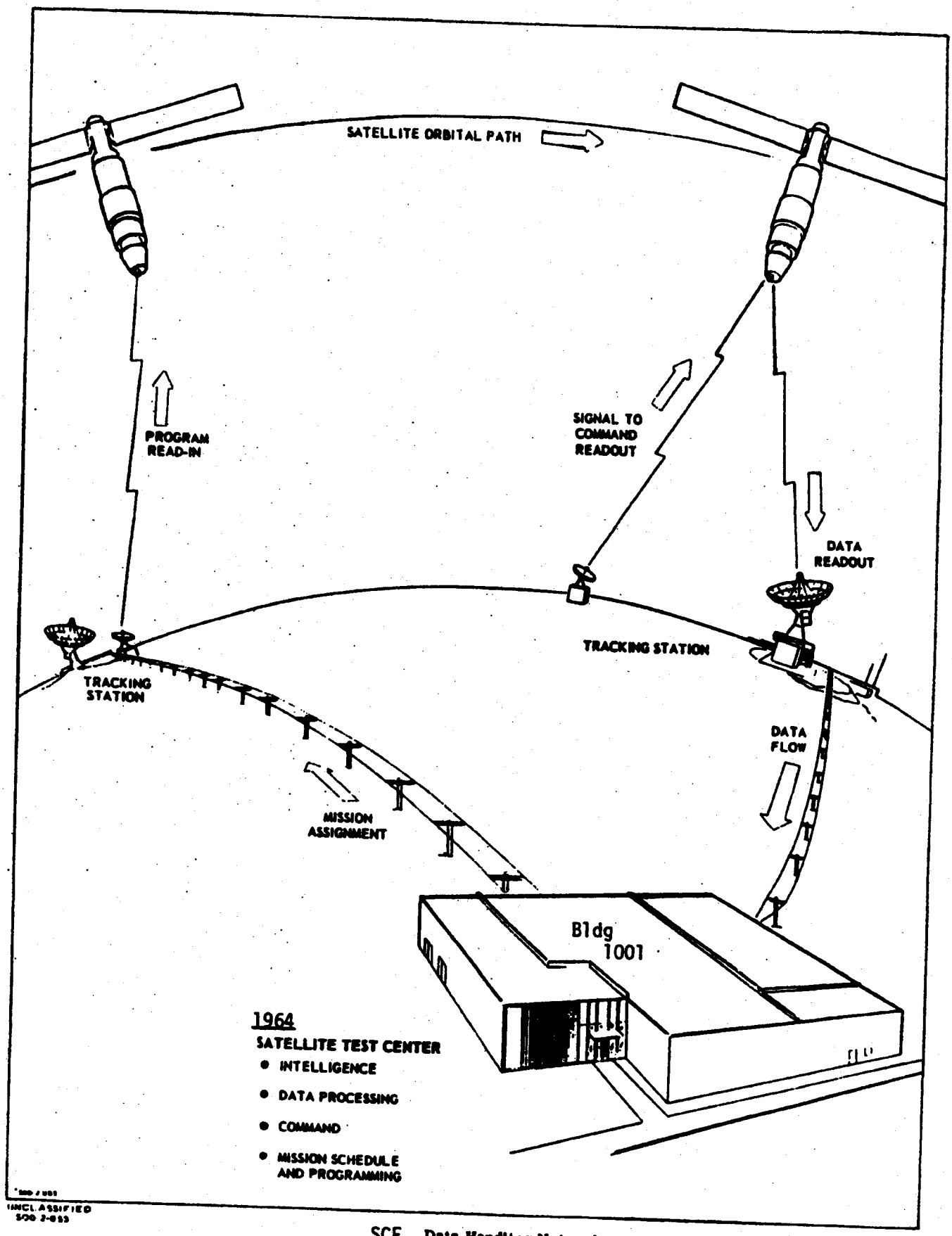
That action included control of the Atlantic and Pacific Missile Ranges, and the satellite control facilities at Sunnyvale, combining them under a single component of the Air Force. Concurrently with the announcement, Secretary of Defense Robert S. McNamera directed the Satellite Control Facility be "nationalized" to serve as a nucleus for development of one orbital facility for all DOD programs. While it was clear that the facility would continue under Air Force management, its development, operation, and management required continuing high level interfaces between the Air Force, DOD, and NASA. Effective management of the SCF, then as now, had national significance and most actions relating to it received national scrutiny. The Secretary of Defense thus considered it imperative that the two separate SSD organizations concerned with planning and operating the SCF be integrated into a single organizational element under a single manager.

The "best-fit" organization that responded to "program support without degradation, a single element, and centralized control," was one which maintained its planning and implementation actions at the same location as most of the programs concerned, i.e., Los Angeles. The initial proposed name for this organization was "Air Force Satellite Control Range," subsequently changed to "Satellite Control Facility." Planning for the organization included designation of the "Deputy for Operations" at Sunnyvale to be the Director for Test Operations; and

the "Deputy for Plans" in Los Angeles to be designated the Director for Engineering (later changed to Development). Program control, procurement and similar functions were to be separate staff functions under the SSD Deputy Commander for Satellite Control Operations. On 30 December 1964, AFSC Commander, General Schriever, approved the plan with two exceptions: (1) The Deputy Commander for Satellite Control Operations would be the Commander, Satellite Control Facility; and, (2) The Director of Test Operations at Sunnyvale would be the Commander of Detachment 1, SCF. The plan was approved by Hq USAF on 18 May 1965 and announced by Hq AFSC special order effective 1 July.

The AFSCF

At this point, Headquarters Air Force Satellite Control Facility was designated and organized at Los Angeles and assigned to SSD. Det-1, AFSCF, and the 6594th Support Group were designated and organized at Sunnyvale. Headquarters 6594th Aerospace Test Wing at Sunnyvale and Det-1 thereof at Donnelly Flats, Alaska, were discontinued. Thus, as of 1 July 1965, the AFSCF consisted of a headquarters, a support squadron, and Det-1 at Sunnyvale; the 6594th Recovery Control Group; and several tracking stations. Headquarters AFSCF was organized in six separate directorates and the support group, each of which reported directly to the AFSCF Commander, as did the geographically separated units.



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SCF Data Handling Network

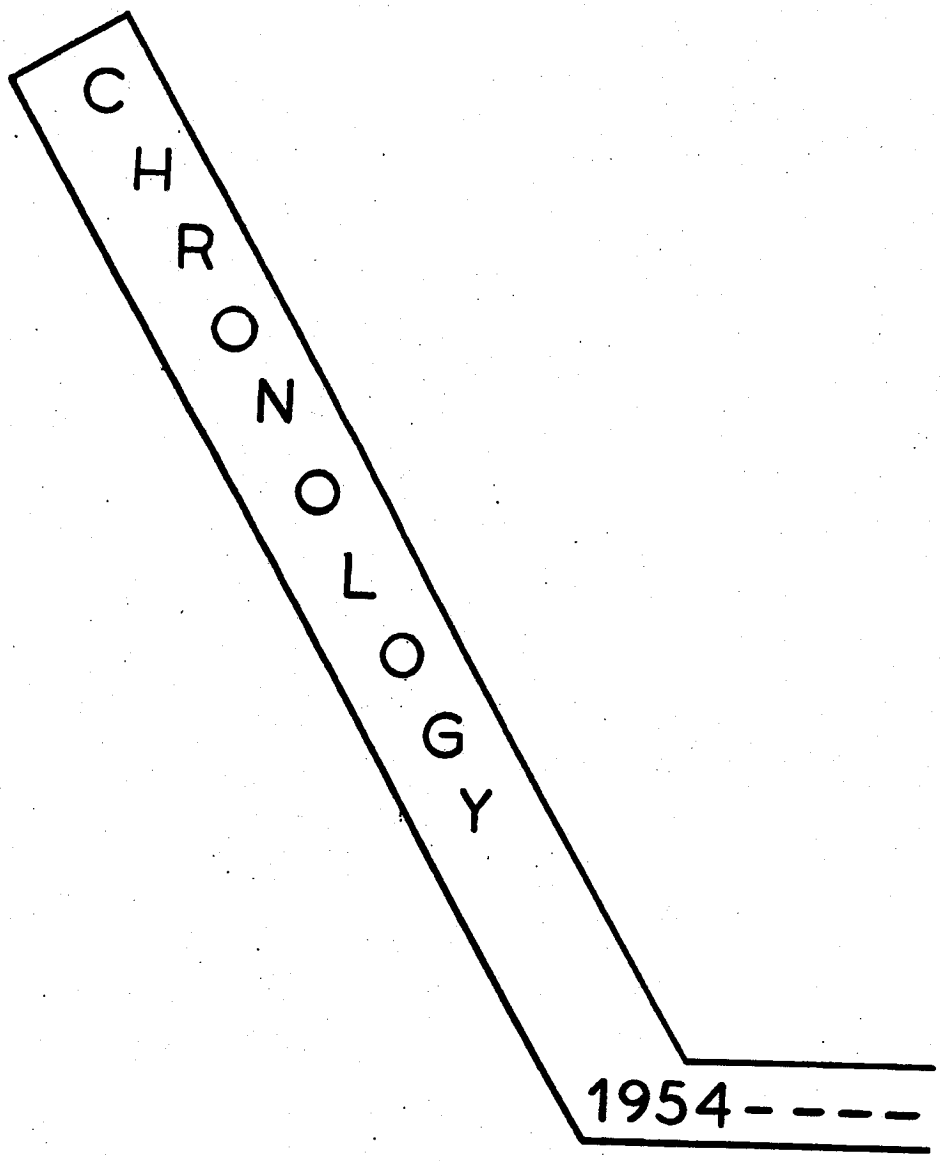
SCF Milestones (1966 - Present)

Following the formal establishment of the AFSCF in 1965, the Mission Control Complex (MCC) concept was developed and approved consolidating all related elements of satellite program control in single centers. Other significant milestones included the replacement of model 1604 computers with CDC 3600's in 1966, followed by installation of CDC 3800's beginning in late 1967. The first Space-Ground Link Subsystem (SGLS) capable satellite was tracked with the SGLS system in late 1968. In 1970, the AFSCF assumed responsibility for the Camp Parks Radiometric Test Facility; supported the first NATO communications satellite; and accepted the Sunnyvale AFS power plant and Bldg 1003. The Interim Wideband Communications System became operational in 1974. After extensive review and debate, Hq AFSC directed SAMSO to plan for a relocation of Hq AFSCF from Los Angeles to Sunnyvale Air Force Station* -- a move accomplished in mid-1977. Telemetry and Command Station (TCS) Oakhanger, United Kingdom, joined the SCF network as a shared resource in February 1978. During the following year, modifications to the Indian Ocean Station were completed for supporting Space Shuttle orbital flight testing, and, the DSCS/SCF Interface System (DSIS), a major advance in data transmission capabilities, was declared operational at the New Hampshire Tracking Station. In 1980 a contract was awarded for the first phase of a comprehensive and critical Data Systems Modernization (DSM) program. On 12 April 1981, the AFSCF supported the first spaceflight of the Space Shuttle orbiter "Columbia" within weeks of receiving its fifth Air Force Outstanding Unit Award.

* Designated as such in January 1971 versus "Satellite Test Annex."

During the past two years the AFSCF continued crucial shuttle support including STS-4, the last of the orbital flight test series, and STS-6 which carried the first NASA Tracking and Data Relay Satellite (TDRS) into space. Today, the AFSCF consists of seven geographically separated tracking stations, the Satellite Test Center, Camp Parks Communication Annex, and recovery forces for aerial and surface recovery of reentry vehicles. The demanding mission of the AFSCF continues to be met through the efforts of dedicated and innovative military, civilian, and contractor personnel who provide around-the-clock operational support -- a trademark of the organization throughout its history.

The chronology which follows covers a remarkable period of advances by the United States and the AFSCF in space operations. Furthermore, the material conveys the persistence of the AFSCF from the early challenges of the 1950's through the technological advances of the 1970's and 1980's. In the area of operational support alone, 1960 figures of 300 contacts and 400 operational hours bear little resemblance to the modern day totals of over 82,000 flight support hours and more than 94,000 contacts reported in 1982. The ability of the AFSCF to perform its acquisition, maintenance, and operation of a common-user spacecraft support network for the DOD echoes its motto: "We shall either find a way or make one."


CHRONOLOGY
1954- - - -

CHRONOLOGY

1954

1 July	Lt Gen Thomas S. Power, Commander, Air Research and Development Command (ARDC), issued verbal orders to establish the Western Development Division (WDD) under the command of Brig Gen Bernard A. Schriever at Inglewood, California.

1955

10 October	General Power announced that management responsibility for the advanced satellite system (Weapon System 117L), would be transferred to the WDD.
9 December	Responsibility for development of the Thor Intermediate Range Ballistic Missile (IRBM) was assigned to the WDD.

1956

15 February	Weapon System 117L responsibility was officially transferred from the Wright Air Development Center to WDD.
12-20 March	A joint ARDC/WDD/Wright Air Development Center/Air Materiel Command contractor evaluation board met to evaluate WS 117L design studies prepared by RCA, the Glenn L. Martin Co., and Lockheed. The board found Lockheed to be most qualified and recommended award of the prime contract to Lockheed for development.
3 July	The Air Force Ballistic Missile Committee witheld approval of WDD's proposed initial operating capability (IOC) program pending further review as part of the Eisenhower administration's economy drive. Austerity in facilities and reductions in military objectives were recommended. The WDD was directed to adopt "a poor man's approach" when working out an alternate IOC program.
29 October	Lockheed Missile Systems Division was awarded a contract as prime contractor for development of WS 117L and its associated Hustler, (later designated Agena), upper stage vehicle.

1957

March	The WDD began feasibility studies regarding a missile detection alarm system (MIDAS) satellite designed to provide early warning of hostile missile launches.

1 June	The Western Development Division was redesignated as the Air Force Ballistic Missile Division (AFBMD) with assignment to Hq ARDC, and no change in station.
4 October	Using an intercontinental ballistic missile, the Soviet Union placed the first man-made satellite, Sputnik I, into earth orbit. Immediately, AFBMD began studies for reprogramming and accelerating its ballistic missile programs. Defense Department restrictions placed on missile production during the previous August were removed while production rates and operational deployment schedules were revised.
12 November	Headquarters USAF sought Defense Department approval of a space program that would provide an early demonstration of space capability and a developmental test vehicle for larger satellite systems.
13 November	Major Gen Schriever directed preparation of a plan for a program leading to development of a man-carrying vehicle system for space operations.

1958

6 January	Lockheed Aircraft Corporation submitted a development plan and cost estimate of acceleration of the WS 117L program using the Atlas booster plus the augmentation of the program using the Thor booster. On 25 Jan, a contract was awarded from AFBMD to Lockheed Missile and Space Division calling for flights scheduled between October-December 1958 and in February 1959.
29 January	The Defense Department announced plans to establish the Pacific Missile Range as part of the Naval Air Missile Test Center, Point Mugu, California, and as a national range to be designed for long-range guided missile and ICBM testing.
31 January	The first U.S. earth-orbiting satellite, Explorer I, was placed into orbit from the Atlantic Missile Range.
1 February	Secretary of the Air Force, James H. Douglas, urged Neil H. McElroy, Secretary of Defense, to approve Air Force use of Thor missiles to boost test satellites into orbit before the end of the year.

3 February	President Eisenhower directed the highest and equal national priority for Atlas, Titan, Thor, Jupiter, and the WS 117L advanced satellite system plus the Ballistic Missile Early Warning System (BMEWS).
7 February	Secretary of Defense Neil H. McElroy activated the Advanced Research Projects Agency (ARPA) which was placed in charge of all DOD space programs during their research and development phases.
10 February	Headquarters ARDC notified AFBMD of instructions for planning a space program. Once DOD approval was gained, AFBMD was to proceed with development of the Blue Scout system to satisfy most research flight requirements. Additionally, the Thor was to be used as a booster for the Able reentry tests, recoverable satellites, and a moon impact mission.
28 February	Roy Johnson, ARPA Director, cancelled the reconnaissance aspects of WS 117L and authorized the Secretary of the Air Force to use the Thor booster with a suitable second stage vehicle for experimental flights and recovery of laboratory animals. The Thor boosted vehicle aspects for the program were known as Program IIA.
March	The Western Test Range began receiving serious consideration for WS 117L support, particularly the Discoverer program, due to the availability of added tracking facilities.
19 March	Lockheed Missile and Space Division's contract was reoriented to include the development of a recoverable capsule to accommodate a biomedical package, later referred to as a "life support system."
31 March	Maj Gen Schriever directed the preparation of a development plan for a full-scale manned military space systems program. The ultimate objective of that program was a manned flight to the moon and a safe return to earth.
30 June	The AFBMD was notified that SecDef Neil H. McElroy had given ARPA responsibility for development of WS 117L.
9 July	Air Research and Development Command was directed to form a provisional unit capable of operating nine C-119J aircraft for aerial recovery of capsules from orbit as required by WS 117L, Program II Aeromedical Program. Tactical Air Command was tasked to furnish fully qualified personnel for the unit, and together with ARDC, to designate the unit commander.

16-19 July — Representatives from ARDC and TAC met with AFBMD officials to organize the new recovery unit -- the 6593rd Test Squadron (Special). TAC identified 133 highly qualified officers and enlisted personnel to man the unit and selected Major Joseph G. Nellor as its first commander.

29 July — The National Aeronautics and Space Administration (NASA) was formed as the civilian agency designated to control peaceful exploitation of space. NASA assumed control of all space programs except those with specific military requirements. The formal organization of NASA was effective 1 October 1958.

1 August — Headquarters ARDC organized the 6593rd Test Squadron (Special) at Hickam AFB, Hawaii, and attached the unit to AFBMD for administrative and operational control. Unit activation, training, equipping, etc., was known by the title "Hot Hand." Assigned C-119 aircraft were crewed by personnel trained at Edwards AFB, California, then reassigned to Hickam AFB.

15 August — The AFBMD activated a field office manned by 20 persons at Palo Alto, California. This field office, or SCF in embryo form, was responsible for Program IIA development and testing associated with achieving an early orbital capability with the Thor booster, and for supporting the Aerobiomedical program designed to assist in development of the U.S. Man-in-Space program.

26 August — Lt Gen Samuel E. Anderson, ARDC Commander, directed AFBMD to establish and man an organizational element for space systems development because of the increased Air Force concern with military space programs.

4 September — The Transit and TIROS satellites began program development with booster responsibilities assigned to AFBMD. Transit was a navigation satellite, while TIROS, or Television Infrared Observation Satellite, was to take television pictures of cloud cover and send meteorological information via relay to ground stations.

11 October — A Thor/Able booster launched NASA Pioneer I, the first successful space probe, into orbit setting a new altitude record of about 70,000 statute miles. AFBMD provided the booster and launched it under NASA direction.

5 November — The Army Signal Research and Development Laboratory and ARDC were designated by ARPA as the military agencies responsible for communications and vehicular aspects of the first U.S. military communications satellite program. Booster and spacecraft development were assigned to AFBMD.

3 December — Announcement was made by the Defense Department concerning details of a Project Discoverer series of polar orbiting satellites developed by Lockheed under AFBMD program management.

4 December — Director of ARPA, Roy W. Johnson, redesignated Program IIA as the "Discoverer-Thor Project" so as to establish the identity of the project individually from the WS 117L effort.

18 December — Project SCORE (Signal Communications Orbiting Relay Equipment), Atlas missile 10B with a communications repeater satellite on board, was placed into orbit from which President Eisenhower's Christmas message was broadcast to the world on the next day. This marked the first time a human voice was beamed from space, and it demonstrated the practical operation of a satellite radio-relay system with intercontinental capabilities.

1959

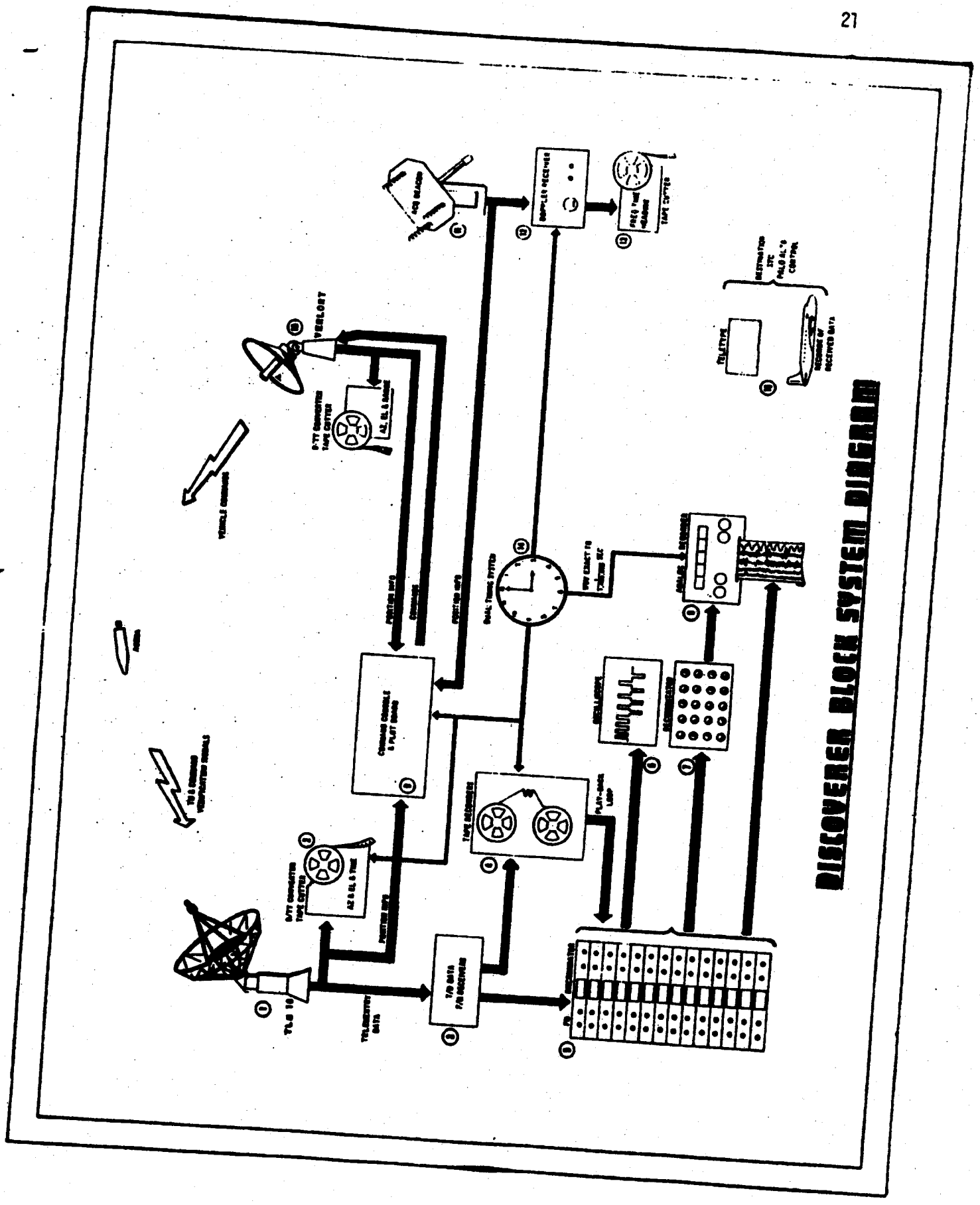
January — An interim satellite control center was completed by Lockheed at the Palo Alto AFBMD field office location.

4 January — The Vandenberg tracking facility and Pacific Missile Range were declared operational and usable for missile launches.

28 February — Discoverer I, the world's first polar orbiting satellite, was launched using a Thor/Agena booster combination from Vandenberg AFB. The SCF supported the launch and received 514 seconds of telemetry at its interim satellite control center in Palo Alto. The mission was the first to use a Thor as a space booster and the first successful flight test of Lockheed's Agena A upper stage designed for orbiting U.S. satellite systems.

3 March — After a successful launch, NASA's Pioneer IV became the first U.S. satellite to be positioned in a solar orbit.

April — The AFBMD transferred the TIROS meteorological satellite program to NASA for use in the national meteorological satellite program.


DISCOVERER BLOCK SYSTEM DIAGRAM

6 April — At Palo Alto, California, Hq ARDC activated the 6594th Test Wing -- the first U.S. military unit to be charged with military satellite operations. That unit was assigned to AFBMD for administrative and operational control. Col Charles G. Mathison became the first commander. At this time the new wing had three operating locations: OL-1 at Edwards AFB, California; OL-2 at Chiniak, Point Kodiak, Alaska; and OL-3 at Annette Island, Alaska.

Announcement was made that seven pilots had been chosen from the U.S. Armed Services for the Mercury Astronaut program established to train the first U.S. space pilot.

13 April — Discoverer II was launched into polar orbit becoming the world's first satellite to be stabilized in orbit in all three axis. The SCF performed the first commands to maneuver a satellite from earth, to separate a reentry vehicle upon command, and to send that reentry vehicle back to earth. The first recovery operation was planned for the following day. However, the capsule ejector system malfunctioned and the vehicle failed to come down in the desired impact area near Hawaii.

25 April — Maj Gen Schriever became Commander of the Air Research and Development Command, and received a promotion to Lieutenant General.

1 June — The 6594th Launch Squadron was designated and organized at Vandenberg AFB and assigned to the 6594th Test Wing. The field office in Palo Alto was disestablished with its personnel transferred to the 6594th Test Wing. The AFBMD further directed that operational control of the 6593rd Test Sq (Special) be assigned to the 6594th Test Wing while the squadron remained assigned to AFBMD.

3 June — A second planned recovery operation was aborted by the 6593rd Test Sq (Special) when Discoverer III failed to achieve orbit.

1 July — The 6594th Data Processing Squadron was designated and organized at Lowry AFB, Colorado. The 6596th Instrumentation Squadron (INS), was designated and organized at Vandenberg AFB. Plans were now underway to implement additional SCF tracking stations at Grenier Field, New Hampshire; Ottumwa, Iowa; and Fort Stevens, Oregon.

19 August — Discoverer VI, a USAF satellite, was launched into polar orbit from the Pacific Missile Range. Its instrument capsule was not recovered due to a malfunction.

23 September — The Defense Department reorganized its space program and assigned primary responsibility for military space programs to the Air Force with control of all long-range missile and booster systems except the Navy's Polaris. ARPA kept responsibility for advanced research on missile defense, solid propellants, and other projects. Existing projects were reassigned to the military services, e.g., MIDAS and SAMOS to the Air Force; the Transit navigation satellite to the Navy; and NOTUS to the Army. With these actions, the move toward Air Force development, production, and launching of military space vehicles became quite clear. In addition, the Air Force took responsibility for all space transportation.

1 October — The 6594th Instrumentation Squadron (INS) was designated and organized at Grenier Field, New Hampshire, and assigned to the 6594th Test Wing. (The operations function was located 17 miles west.) Concurrently, the 6594th Data Processing Squadron at Lowry AFB was redesignated as the 4999th DPS with no change in station or parent organization.

1 November — Hq ARDC organized and activated the 6594th Recovery Control Group at Hickam AFB and the 6593rd INS at Wheeler AFB, Hawaii. The 6593rd Test Squadron (Special) was reassigned to the 6594th Test Wing.

11 November — The Air Force purchased 11.423 acres of land in Sunnyvale, California. Deeded from the Prudential Insurance Company, that land included the newly constructed Bldg 171 (now 1001).

15 November — The 6594th Test Wing was reassigned from Hq ARDC to Hq AFBMD without change of station. Hq AFBMD was constituted and activated at Los Angeles as part of an overall ARDC reorganization which resulted in the establishment of a new division structure. The Wright Air Development Division and Air Force Command Control Development Division were also established.

17 November — Based on the 23 September decision, all Defense Department satellite and space vehicle programs were approved for transfer back to the military services of primary interest. As a result, the Discoverer, MIDAS, and SAMOS programs were reassigned from ARPA to AFBMD. All three programs were originally part of the WS 117L program which AFBMD managed from their inception in 1955 until the ARPA assumption of responsibility on 30 June 1958.

1960

15 January — The 6594th Test Wing was redesignated as the 6594th Test Wing (Satellite) at Palo Alto.

29 February — When ARPA issued an interim directive cancelling the the three-phase development program for a military communication satellite system (Projects Steer, Tackle, and Decree), the AFBMD was directed to conduct a single integrated research and development program for a 24-hour synchronous equatorial global communications satellite system subsequently designated Project Advent.

1 March — Headquarters 6594th Test Wing(Satellite)moved from Palo Alto to Sunnyvale where an interim satellite control center was activated in the Lockheed complex. At AFBMD, a Deputy Director for the Satellite Control Office was designated and a command and control contract was issued to Lockheed which separated the satellite control function as an entity rather than as part of one or more general contracts being handled by AFBMD in Los Angeles.

1 April — Headquarters ARDC officially announced a change of address for the Hq 6594th Test Wing (Satellite) from Lockheed Missile and Space Division Facility, Palo Alto, to Lockheed Missile and Space Division Facility, Sunnyvale, California.

The NASA TIROS I weather satellite was placed into the most accurate orbit yet achieved by any U.S. satellite opening a new era in meteorology by sending 23,000 pictures of global cloud cover from a 450 nautical mile orbit above the earth. TIROS I completed 1,302 orbits before its operational life ended on 29 June 1960.

The Air Force accepted technical facilities at the New Boston Tracking Station.

7 June — The official location of the 6593rd Instrumentation Squadron was announced by Hq ARDC from Wheeler to Hickam AFB, Hawaii.

14 June — The civilian nonprofit Aerospace Corporation was incorporated in California with the prospect of $35 million in Air Force business during FY 61. The company was intended to replace the Space Technology Laboratories as an associate contractor for ballistic missiles and space programs with the exception of a number of advanced Air Force projects.

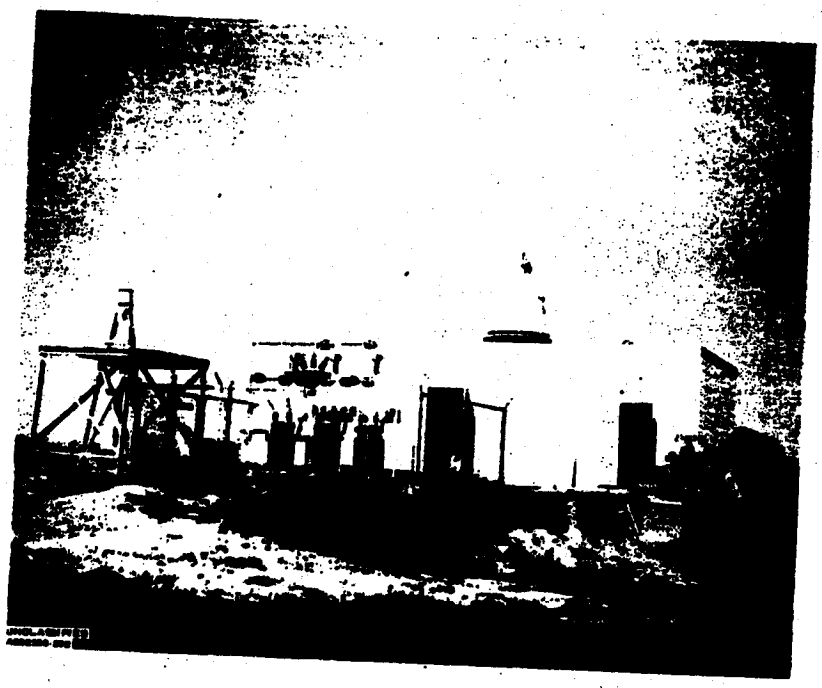
7 July — Hq ARDC announced that the designation "Sunnyvale Satellite Test Center" was changed to "Sunnyvale Satellite Test Annex."

TLM-18 Antenna System

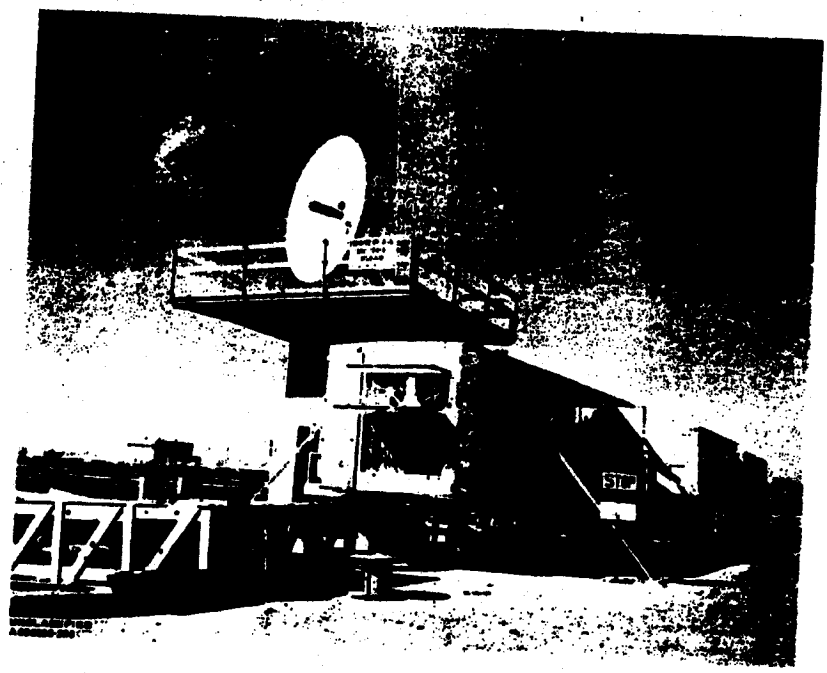
High gain antenna, telemetry autotracker used at VTS and HTS.

T&D Antenna System

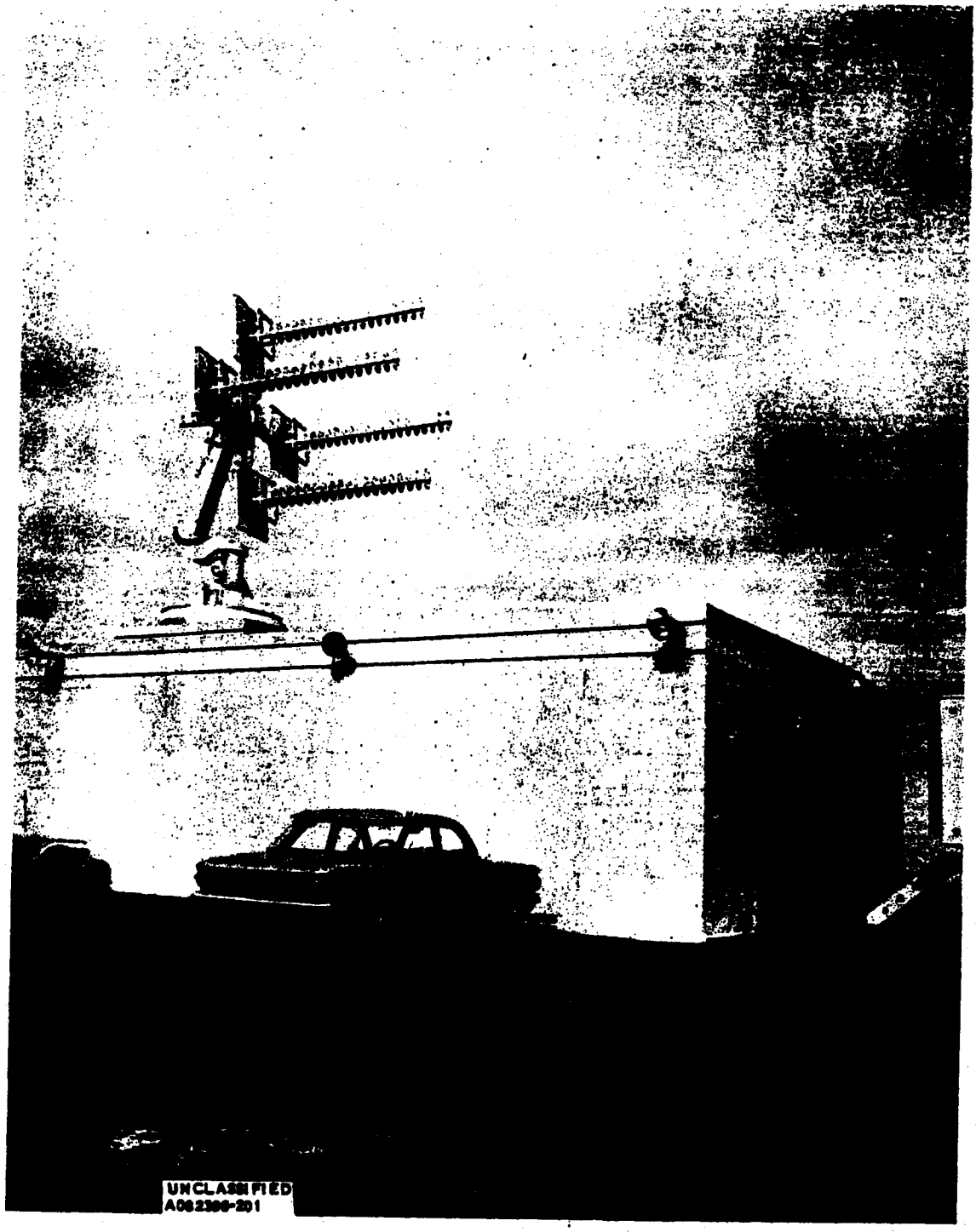
Data Receiver (DR)
Common only to VTS and NHS for supporting satellites with apogees to 70,000 NM. (400 MHz)



Command Transmitter



Radar Vans and Verlort Antenna



Disc-on-Rod Antenna

Medium gain antenna, telemetry autotracker last used at Thule Tracking Station.

11 August	The data capsule from Discoverer XIII was ejected on the 17th pass and recovered in the Pacific Ocean near Hawaii by a Navy helicopter that was part of the 6593rd Test Sq (Special) task force. Thunderstorms prevented aircraft from reaching the area in time for a planned aerial recovery. The surface recovery was the first successful recovery of a man-made object ejected from an orbiting satellite. It was first sighted by C-119 aircraft crews two minutes after impact. Three recovery aircraft dropped dye markers and smoke bombs to identify the spot.
19 August	Captain Harold E. Mitchell, 6593rd Test Sq (Special), flying a C-119J, recovered the descending Discoverer XIV capsule northwest of Hawaii for the first successful aerial recovery of an object returned from orbit. The capsule, snagged on the third pass, was in perfect condition except for slight scorching on its upper surface. Captain Mitchell received the the Distinguished Flying Cross for his efforts, and the remaining eight crew members received Air Medals for their role in the operation.
21 August	Colonel Alvan N. Moore replaced Colonel Charles G. Mathison as Commander, 6594th Test Wing (Satellite).
23 September	Lt Gen Schriever, ARDC Commander, recommended that the ballistic missile and space research and development complex at Los Angeles be split, with the former moving to Norton AFB, California, near San Bernadino. He also called attention to the need for a well-defined USAF space program, managed by the only Defense Department agency having any national image in the space field. The missile and R&D split was recommended with the idea that ARDC's Inglewood complex would become the Air Force military space development agency.
1 October	The 4999th Data Processing Squadron at Offutt AFB, Nebraska, and Det-1 thereof at Lowry AFB, Colorado, were discontinued by Hq ARDC. Responsibility for their mission was transferred to the Air Force Command and Control Development Division.
1 December	Installation of a 60' Telemetry and Data Receiving Antenna was completed at New Boston Tracking Station.

15 December — The Vela Hotel Joint Management Team with representatives from NASA, ARDC, and the Atomic Energy Commission, met at Hq AFBMD to begin planning for a high altitude satellite system that would be capable of detecting nuclear detonations on the surface of the earth or in space.

21 December — The first ICBM operational reentry vehicle ever recovered was fished out of Eniwetok Lagoon following a missile launch from Vandenberg AFB using an Atlas D on 16 December.

1961

31 January — A 37½-pound chimpanzee was carried into space for the first suborbital flight in a Project Mercury capsule. The animal was recovered after the test of the capsule designed to carry the first U.S. astronaut into orbit. Earlier successes included a 13 October 1960 Atlas rocket with three mice in its nose cone. The mice were launched to an altitude of 700 miles and picked up in the Atlantic, thus becoming the first living creatures to return alive from that distance in space.

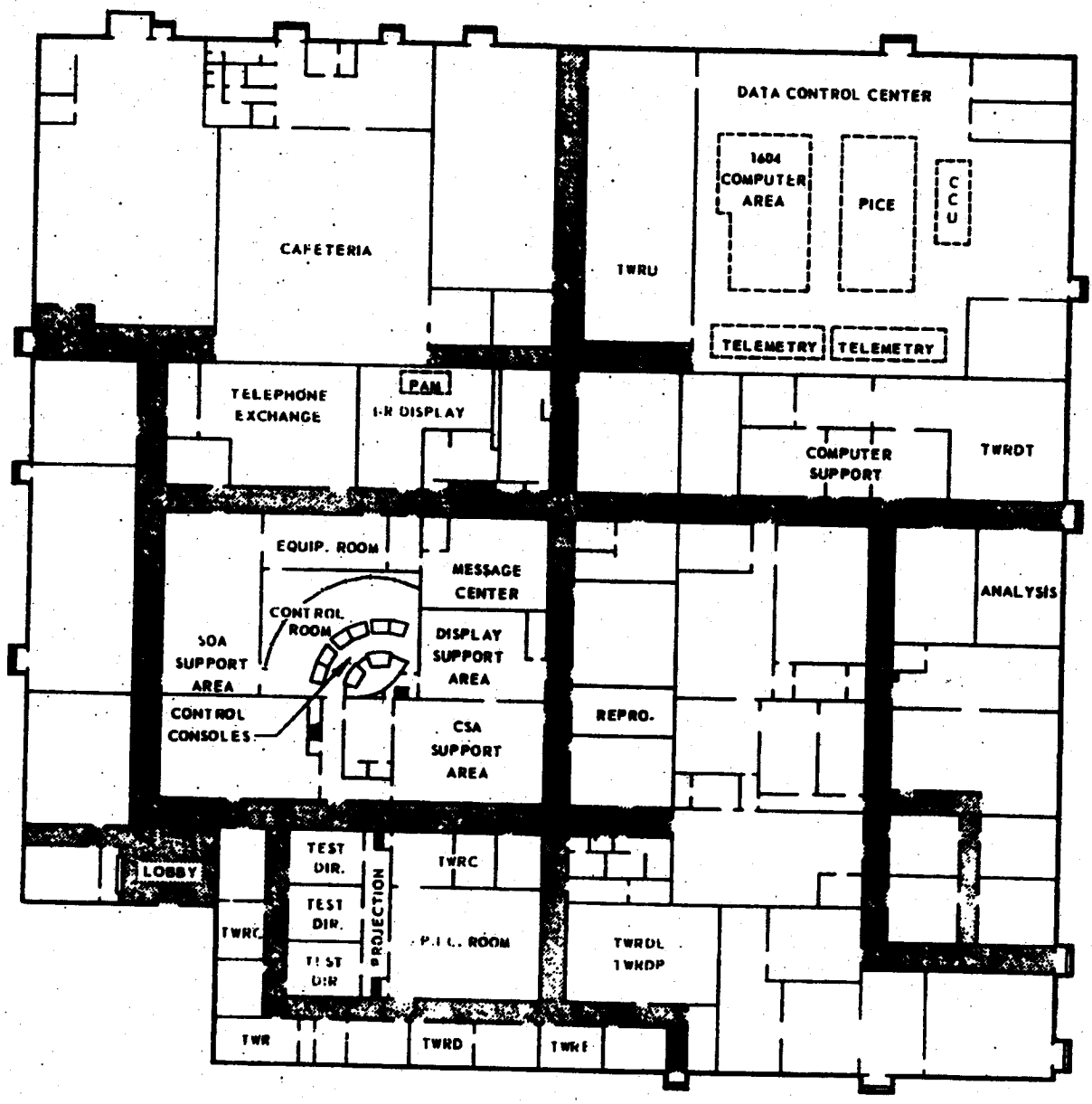
6 February — The satellite operations center at Sunnyvale moved from its interim control area to a new control room in Bldg 1001 during the final phase of SAMOS II flight testing. Full system integration of control room equipment was completed 1 March.

14 February — Acting on General Schriever's recommendations of September 1960, the Air Force decided to permanently locate AFBMD headquarters in the Inglewood, California, area to manage ballistic missile and space programs prior to transfer of systems management responsibility. The Ballistics Missiles Center was slated to move to Norton AFB to perform production, site activation, and follow-on support after transfer of that responsibility.

17, 18 February — The first multiple satellite operations were conducted from the satellite control room, Satellite Test Annex (STA), during the dual operation of Discoverer flight test vehicles 1102 and 1104. On 18 February an Agena engine was successfully commanded to ignite for a second burn while in orbit (Discoverer 1102).

20 February — The Air Force Satellite Photographic Processing Lab having been established as a named activity, led to ARDC designating and organizing the 6594th Test Squadron (AF Satellite Photo Processing Lab) at Westover AFB, Massachusetts. The new unit was assigned to the 6594th Test Wing (Satellite) by ARDC and attached to the host base for administrative/logistical support.

STC LAYOUT - 1961



Original STC following the first increment of additional construction which added 45,600 square feet to then Bldg 171. The second expansion occurred in 1963 with the addition of 4,200 sq ft for a communications center, crypto equipment room, and electrical/mechanical room. A 1,400 sq ft penthouse was also added to house chillers and chill water pumps over one room.

6 March	Secretary of Defense Robert S. McNamera assigned responsibility for the development of military space systems to the U.S. Air Force.
14 March	Headquarters 6594th Test Wing (Satellite) discontinued its Operating Location #3 at Annette Island, Alaska, and designated a new OL-3 at Donnelly Flats, Ft. Greely, Alaska, effective 15 March.
17 March	Secretary of Defense McNamera announced that all Air Force activities concerned with acquisition of systems "some of which are carried on by ARDC and some by Air Materiel Command (AMC)," would be consolidated in a new command to be known as the Air Force Systems Command, (AFSC). On 20 March, Eugene M. Zuckert, Secretary of the Air Force, announced that AMC would be redesignated as the Air Force Logistics Command (AFLC), and ARDC would become AFSC effective 1 April.
1 April	The Air Force reorganization announced on 17 March led to the formation of three new commands from the former ARDC and AMC commands. The Air Force Systems Command, Air Force Logistics Command, and Office of Aerospace Research (OAR) emerged. Also coming from former elements of ARDC and AMC were the Space Systems Division (SSD) with responsibility for military space systems and boosters; and the Ballistic Systems Division (BSD) for handling ballistic missile development and site activation. Both organizations were positioned under the Deputy Commander for Aerospace Systems located in Los Angeles. As part of these actions, the 6594th Test Wing (Satellite) at Sunnyvale, was assigned to SSD. A Satellite Orbital Control Plan was published by Lockheed for the Discoverer, MIDAS and SAMOS satellites. The Vandenberg Tracking Station became a "blue-suit" operation when the 6596th Instrumentation Squadron assumed responsibility for management, operations, and maintenance. The Air Force assumed responsibility for operations and maintenance of all ground-space equipment at the New Boston Tracking Station. The 6594th Test Wing (Satellite) assumed responsibility for managing the Satellite Control System.

5 May	Astronaut Alan B. Shepard, Jr., made the first U.S. manned space flight in a Mercury spacecraft launched from Cape Canaveral. In "Freedom 7," he completed the first mission of NASA's Project Mercury after a 15 minute suborbital flight which reached an altitude of 115 miles.
25 May	President John F. Kennedy called for the U.S. to meet the goal of landing an American on the moon "in this decade." His statement followed the Soviet Union's successful world's first manned earth orbiting flight of 12 April.
9 June	The official emblem and motto of the 6594th Test Wing (Satellite) were approved by Hq USAF.
15 June	The New Boston Tracking Station was certified ready for operations and participation in the MIDAS program having previously been limited to passive tracking for Discoverer XIII.
15 July	The 6594th Launch Squadron at Vandenberg AFB was deactivated by Hq AFSC.
	Aircraft JC-130B #526 demonstrated a recovery operation during the first public exhibition of satellite recovery techniques before a large crowd which included the U.S. Vice President and other dignitaries during an air show at Randolph AFB, Texas.
Jul-Dec	A second CDC 1604 computer system was installed at the Satellite Test Annex with IBM on-line/off-line equipment being replaced by CDC equipment. Augmented communications circuits were installed at Kodiak, Pt. Mugu, Kaena Point, New Boston, Thule, and Vandenberg. Secure circuits were installed to several stations, and a 100 wpm circuit was added to Fort Monmouth.
September	A tenancy agreement between the 6594th Test Wing (Satellite) and Moffett NAS was signed and the Base Flight Branch moved into permanent quarters at Moffett Field. The Navy made a flightline building available for an aircraft maintenance center. A total of 45 pilots were assigned; 33 checked out in C-47's and 12 in U-3's.

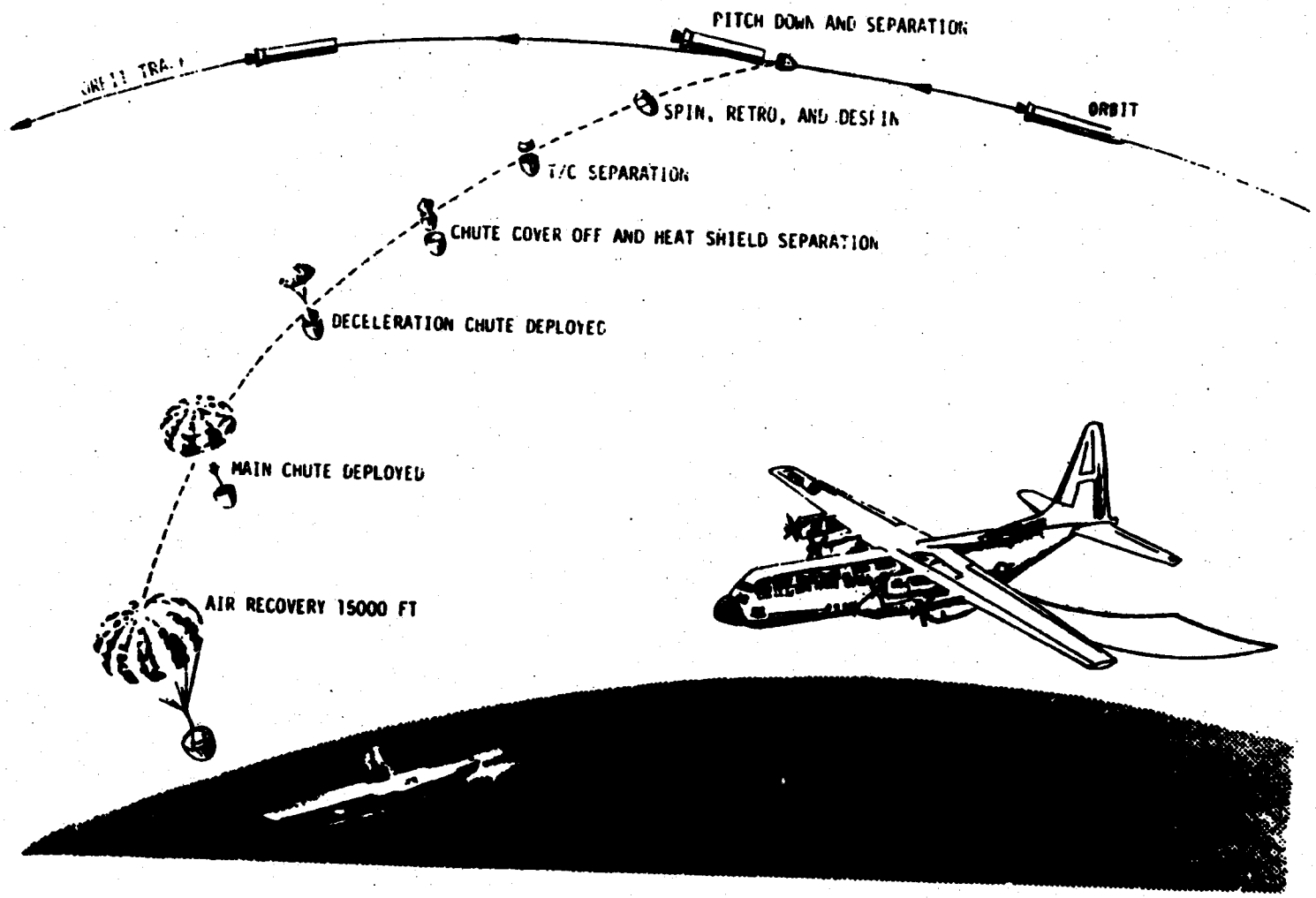
15 September	Flight test support was transferred from the Palo Alto 1103A computer facility to the Satellite Test Annex.
3 October	Palo Alto computers were deactivated and all computer operations were contained in the STA for the first time.
15 October	Hq AFSC designated the following 6594th Test Wing (Sat) operating locations: OL-4, Annette Island, Alaska; OL-5, Thule Air Base, Greenland; OL-6, Fort Dix, New Jersey; and OL-7, Camp Roberts, California.
November	Advent circuits to Fort Monmouth, Fort Dix, and Camp Roberts were activated.
1 November	The 6594th Test Wing (Sat) was redesignated as the 6594th Aerospace Test Wing without change in station or assignment by Hq AFSC.
14 November	The "Mugu data line" (with voice alternate) was activated.
21 November	A full duplex data line was activated between ACES and Kaena Point.

1962

Jan-Jun	Space Systems Division engineers developed the concept for the advanced Space-Ground Link Subsystem (SGLS), approved by higher headquarters during the second half of 1962. Industry was asked to submit proposals for the program which was initiated in response to the need for equipments having improved performance in many respects; notably in higher data rate capability, communication security, extended reliable lifetime of vehicle components, and radiation hardening of vehicle equipment. The SGLS program was directed subsequently to use state-of-the-art techniques to yield a high confidence in meeting specified performance and schedule requirements.
January	The 6593rd Test Squadron (Special) sent its Air Recovery Section to Cuba for an "indefinite" period with three H-21 helicopters. One was returned to Wheeler AFB, Hawaii, after two weeks in Cuba where it served as a support and rescue aircraft.
18 January	From now through mid-March, full duplex secure circuits (100 wpm) between the Satellite Test Annex (STA) and the Annette, Kaena Point, Vandenberg, Kodiak, New Boston, and Thule tracking facilities were activated and approved for transmission of classified information.

15 January	The last two of nine C-119 aircraft originally assigned to the 6593rd Test Sq (Special) were transferred out of the unit for eventual replacement by 10, JC-130B aircraft. The H-21 helicopter force would be converted to CH-3B's.
20 February	Marine Lt Col John Glenn became the first American to make an orbital space flight. He covered a total of 81,000 miles in four hours and 56 minutes in the spacecraft Friendship 7.
1 March	Operating Location #4 was activated at Annette Island, Alaska.
15 March	The Orbital Requirements Document (ORD) concept was approved as a major management improvement by the Space Systems Division. Previously, requirements were received in a wide variety of formats. The ORD standardized submission of orbital requirements by all agencies requesting support for a particular program. A project to upgrade the 6594th Recovery Control Group's Recovery Control Center with installation of a closed circuit television system (Recovery Status Display) was completed.
30 March	A contract was awarded by the Sacramento District Engineer, Corps of Engineers, for a two-story addition of 24,000 square feet to the Satellite Test Annex. Cal Contractors of Palo Alto were awarded the $368,979 contract and began the addition on 2 April. Thule Tracking Station was declared operational. The station began support operations in April after radome installation for verlort and quad-helix antennas in January, systems checkout in February, and completion of the KW-26 secured communications circuit during that month.
April-June	Facilities at the STA were upgraded to support multi-satellite operations. The computer capability was increased from two CDC 1604 and two CDC 160-A computers to four CDC 1604's and six of the CDC 160-A's. Over the preceding month the on-line Multi-Operations Section was formed with an Orbit Planning Branch specifically organized to develop a philosophy and interface procedures for multi-operations. By the end of 1962 and henceforward, the SCF devoted over 90 percent of its operational time to such operations.

2 April	Construction on Building 1002 (the STA addition) was begun by Cal Contractors.
6 April	The 6593rd's Air Recovery Section moved from Wheeler AFB to Hickam AFB, Hawaii, where it acquired the added task of ferrying key personnel to and from Kaena Point with about two sorties required daily.
15 April	Detachment 1 of the 6594th Aerospace Test Wing was designated and organized at Donnelly Flats, Alaska.
26 April	Annette Island supported its first orbital vehicle as an operational station. The facility had tracked its first orbital vehicle on 21 February during crew training and system verification operations. Annette Island was declared fully operational on 25 May 1962.
	Ariel I was launched as the first international satellite with a United Kingdom payload which studied the ionosphere.
May	The final two JC-130B aircraft were delivered to the 6594th Recovery Control Group at Hickam giving the unit a total of seven to complete the conversion from C-119's. The C-130 winch systems were capable of aerially recovering up to 3,000 lbs., versus the 800 lbs. C-119 capability.
	A 150-ton temporary air conditioning system was leased and installed by the Aladdin Heating Company for Lockheed in order to provide conditioned air for the new STA computers pending completion of a 4,200 square foot facility addition on the east side of the STA.
23 May	Secretary of Defense Robert S. McNamera issued directives effectively cancelling the Advent program and approving development of a new minimum essential satellite communications system for the DOD.
11 Jun	The DOD announced reassignment of responsibility for what had been the Advent program. The Air Force assumed development, production, and launch responsibility for all space devices, in line with the policy originally delineated on 6 March 1961. The Army retained responsibility for the ground system with the Defense Communications Agency (DCA) being responsible for integration.



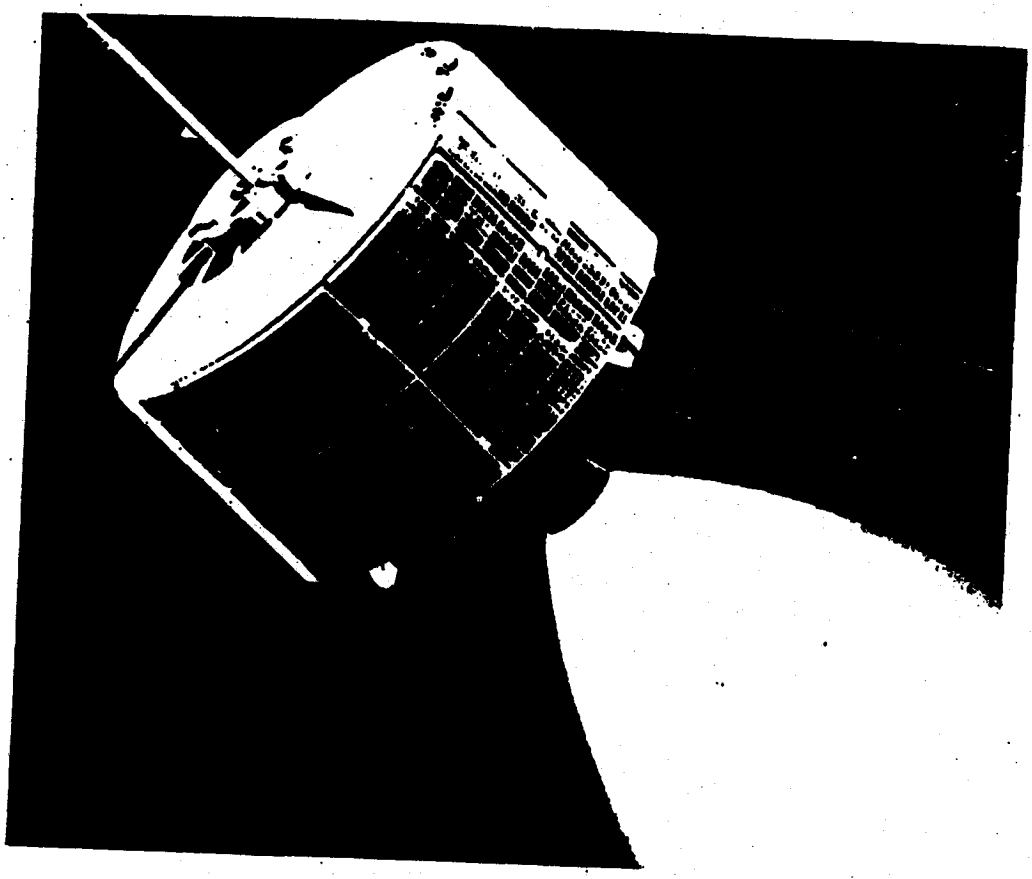
Typical Recovery Sequence

July-December	A "Computer Operations Magnetic Tape Library" was established to account for, control, test, and insure the quality of all tapes used on STA computers.
	Vandenberg Tracking Station prelort tower construction, including antenna emplacement of the radome was completed. Construction at Thule began in July. Prelort was an improved angular tracking accuracy version of the verlort antenna system.
	Multi-satellite operations involving five vehicles were conducted for the first time. The STA had a single control room and was capable of supporting up to three vehicles simultaneously during the previous year.
2 July	The forerunner of the Director of Test Operations, the Deputy for Space Test Operations, was organized with six major subordinate offices. The Space Vehicle Office was the largest with six divisions. Others included the Spacecraft Recovery Office, Space Vehicle Test Operations and Planning, Staff Meteorology, Procurement and Production, and the Space Vehicle Ground Communications Office.
5 July	Secretary of Defense Robert S. McNamera issued to the Secretaries of the Air Force and Army along with the Director, Defense Communications Agency (DCA), a memorandum clearly defining the responsibilities of each in development of a defense communications satellite system. The Air Force was assigned development of the space vehicle and satellite communications components along with future space elements of the system. Space Systems Division subsequently took those tasks for development of a medium-altitude communications satellite system and point-to-point repeater satellites to be placed in a synchronous orbit.
10 July	A NASA/Thor/Delta boosted the first commercially developed international communications satellite, Telstar I, into orbit for transmitting television pictures between the U.S. and Europe.
26 August	The first interplanetary robot space probe, Mariner 2, was launched on a four-month, 180 million mile journey to Venus. After 109 days the probe passed within 21,000 miles of the planet on 14 December.
31 August	Colonel William K. Kincaid replaced Col Alvan N. Moore as Commander, 6594th Aerospace Test Wing.

Sep-October	A Christmas Island operating location controlled by the 6593rd Instrumentation Squadron (INS), was completed and declared operational on 12 October. It was operated by General Electric personnel and performed some tracking functions on orbital vehicles with a limited readout capability. The contract was due to expire by 31 Jan 1963 unless extended/renewed.
28 September	An additional facility of 24,000 square feet was accepted for occupancy on the north side of the STA. Wing Headquarters moved from Bldg 104, Lockheed, to the new addition. From now until 1971, some 40 trailers would be used to supplement requirements for administrative space.
October	HULA/HICK/CAPE voice circuits were patched into Mercury Control for support of manned Project Mercury missions. Additionally, the Recovery Control Group provided JC-130B aircraft for airborne location and search in support of Mercury capsule recoveries. Pre-training for those operations was extensive throughout September 1962.
3 October	The 6593rd Test Squadron acted as primary contingency force for a Mercury recovery mission. Aircraft homed in on the capsule beacon, but the recovery was made in the primary impact zone. Earlier, on 11, 29 September, the squadron participated in dress rehearsals.
November	Very Long Range Tracking (Verlort), 6-tone, 15 Command System installation was complete at the Kodiak, Annette Island, Hawaii, Vandenberg, New Hampshire, and Thule Tracking Stations.
3 December	The DOD announced plans to immediately develop a detector-interceptor satellite (Project Saint), had been cancelled. SSD had program management responsibility for this project.
8 December	Verlort tower construction, including emplacement of the antenna dish, pedestal, and radome was completed at Thule Tracking Station.

1963

January	A secure circuit from the STA to the Pentagon was activated after installation of KG-13 data equipment in the crypto facility.
January-June	Mahe Island, Seychelles Group, was selected as the location for a new tracking station (OL-9). Technical equipment and prefabricated support facilities arrived in Mahe via ship on 29 June. A program peculiar site, the station was ready to provide tracking and control requirements nine months later despite no government-to-government support agreements, poor transportation to the island, and with an unsettled political situation in the country.
	Space Technology Laboratories at Redondo Beach, California, was selected from a field of competitive bidders for development of the Space-Ground Link Subsystem (SGLS).
	The microwave link between Vandenberg and the STA was completed and placed in service.
	By the end of June the STA had five CDC 160A computers. Two of four CDC 1604 computer systems were reconfigured with one 523 card punch, one card reader-collator, one control unit, and four tape units thus resulting in multiple satellite hook-up capability.
31 January	Hq SSD asked for requests for proposals for development of a medium-altitude military communications satellite system that would be developed in place of the former Project Advent.
February	The 6593rd Test Squadron (Special) received the Air Force Outstanding Unit Award for the period 1 August 1958 through 30 April 1962.
14 February	NASA's Syncom I (Synchronous Communications Satellite), was placed into orbit. Syncom was a NASA project supported by DOD ground stations and communications experiments.
25 February	A second STA addition of about 25,000 square feet for $500,000 was authorized for design. Preliminary design was completed by the end of June 1963.



SYNCOM

Artist's conception of NASA's Syncom (Synchronous Communications) satellite placed into orbit on 14 February 1963 and supported by DOD ground stations and communications experiments.

March-June	Negotiations were opened with the Seychelles Government concerning additional privately-owned land in the Grand Anse area, Mahe Island, with about 80 acres required.
10 March	The first vans arrived on Mahe.
19 March	Helicopter 51-15872 belonging to the 6593rd Test Sq (Special) was lost in a crash at sea. Investigation revealed that materiel failure of the longitudinal control link in the aircraft control system was the probable cause of the mishap. A replacement helicopter arrived from Edwards AFB on 19 April and was ready for recovery/rescue missions by mid-May.
22 March	The first voice and teletype circuits were activated at Mahe Island.
April	1200 bit per second (bps), secure duplex data circuits were activated between the STA and New Boston. Similar circuits were activated between the STA and Thule in May.
14 May	The Advanced Ballistic Reentry System (ABRES) program was established as a Defense Department joint-service effort for reentry vehicle research, development, and testing.
15 May	The last of four flights in the Project Mercury series was completed by Astronaut L. Gordon Cooper, Jr., in Faith 7 which completed a total of 22 orbits in 34 hours and 20 minutes. This represented the longest manned U.S. space mission to date. Project Mercury officially ended on 12 June.
June-July	NASA and SSD clashed over allocation of frequencies. The SSD successfully defended its request for wideband data link channels and narrowband channels for the SGLS. NASA countered for exclusive use of the entire 2.2-2.3 Mhz band in the U.S. and its possessions. Subsequent meetings were planned to give major military users of telemetry bands an opportunity to present their requirements on a case-to-case basis.
July-December	Two C-47 aircraft assigned to the Base Flight Branch were supported by 29 pilots and 13 navigators at NAS Moffett.
	New display and communications equipment was installed in Display Operations and all direct support operations were transferred to another room at the STA. Six CDC 166 remote printers were also installed.

July-December

The "Augmented Satellite Control Facility" began continuous multi-satellite operations with at least one multi-satellite pass daily from 17 October to the end of the year. During 1963, the STA supported six satellite programs while working on its plan to standardize the overall network system. Results of an analysis of the SCF's ability to support its assigned load with particular stress in the 1963-1965 period led to a recommendation to augment equipment at the tracking stations and STA, essentially doubling the capabilities of certain stations. While procurement of TT&C equipment was in progress, further studies showed the SCF had a great system in the gross sense, but that its ability to support multiple satellite operations for an extended period was extremely limited. The original augmentation of subsystems was then revised to include simplification and standardization of configurations and implementation of system-oriented methods for data handling and control. That program became known as the SCF Augmentation Program.

Operating Location #1 at Edwards AFB continued to test new or modified recovery equipment including parachutes, hooks, poles, and horseshoe balloon recovery systems. Feasibility testing for recovering X-15 ventral fins was also performed with successful ground pick-up, tow and boarding on 27 December.

The Multi-Satellite Augmentation Program provided the Hawaii Tracking Station with four new subsystems -- Precision Long Range Tracking Radar (Prelort), FM/FM Telemetry Ground Station, Data Handling, and Control and Display. Timing, Interstation Communications, and Intrastation Communications were modified.

At the Vandenberg Tracking Station, a 2.2 Ghz receiving and tracking system was installed in the Data Receiver area along with a new tracking and command computer (CDC 160A). Prelort passed checkout and began to support on-orbit vehicles.

1 July

The 6594th Aerospace Test Wing's Supply Branch began its responsibility for the supply and support function of the SCF with an AFK Account consisting of 66,546 line items valued at $2,328,342.80.

1-5 July	At Mahe Island, Seychelles, all station modules, housing modules, and receiving/transmitting equipment were unloaded from a ship for transport to OL-9. A temporary housing area and a dining facility were declared operational on 15 July.
26 July	Syncom II (NASA), the first operational communications satellite, was placed in synchronous orbit following a launch from Cape Canaveral.
1 August	The Mahe station and antenna construction work was completed.
August-September	The crypto maintenance facility moved within the STA with single side band radio moving also, thus a consolidation of all communications operations in a central area occurred.
10 August	The Mahe receiver and transmitter sites were activated.
25 August	Operating Location #9, Mahe Island, Seychelles, was declared operationally ready (conditionally) for providing substantial equatorial support and on-orbit coverage for polar satellites, particularly during their first revolution.
September	The Multi-Satellite Augmentation System was first used operationally.
4 September	Weekly HU-16B aircraft service between Africa and Mahe Island was initiated.
6 September	At the STA, the Pic Room received modifications including further acoustical treatment and redecoration.
9 September	Cabinet-mounted, 100 wpm teletype model 28's (receive only) monitor services were installed at 15 STA locations replacing a 60 wpm model.
18 September	The first Aerothermodynamic/Elastic Structure Systems Environmental Tests (ASSET) program vehicle was launched on a successful suborbital flight from Cape Canaveral. The ASSET program was designed to test materials and study flight characteristics of glide reentry vehicles.
28 September	The SNAP-9A satellite, first to be operated completely with nuclear power, was launched. Unfortunately, whenever it was turned on the reactor caused the telemetry to be unusable.
	The Indian Ocean Station (IOS), performed its first successful satellite operations support.

16 October — As program manager for DOD, the Space Systems Division launched two Vela nuclear detection satellites from Cape Canaveral. Vela satellites were developed and produced by TRW Systems Group and the first pair in a series to provide information on nuclear detonations in the atmosphere or in outer space. The 297 pound satellites were placed in a near-circular earth orbit about 70,000 miles above the Earth's surface. Design life was about six months.

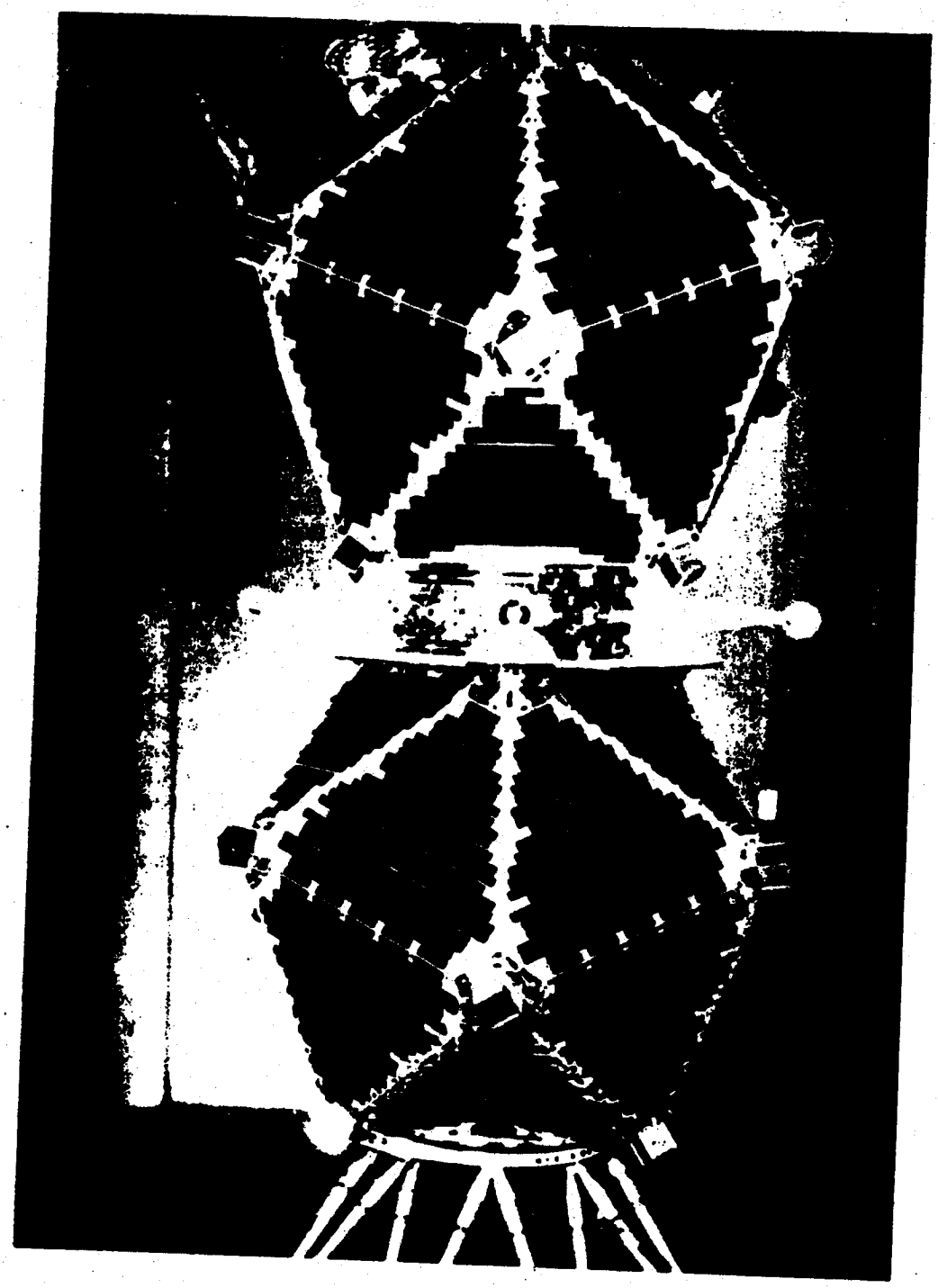
22 October — Three CH-3B helicopters were accepted by the 6593rd Test Sq (Special) at Tyndall AFB, Florida, for further modification by Sikorsky and eventual delivery to replace the unit's H-21 helicopters.

18 November — The 6594th Instrumentation Squadron was reorganized. The unit formerly had three crew chiefs, each liable for a 78-man operational crew. The new system had no crew chiefs. Instead, an Operations Control Area Supervisor was given responsibility for all operational station areas. A reduction of 70 Philco personnel was planned based on the phase-out of old equipment and phase-in of new Augmentation program equipment.

20 November — The Secretary of Defense announced transfer of the Naval Missile Facility at Point Arguello, California, to the Air Force together with Navy tracking stations in the Pacific. The Air Force became the single manager for ICBM and space tracking activities to include control of the Atlantic Missile Range, the Pacific Missile Range, and satellite control facilities located at Sunnyvale, California. The SCF was directed to be "nationalized" to serve as the nucleus for the development of one orbital facility for all DOD programs.

December — The recovery capability was enhanced with the 76th Air Rescue Squadron receiving lights to aid forces during night operations marking the first time para-rescue forces were permitted to enter the water at night to perform rescue missions. That action also provided more assurance that satellite payloads would be protected and reduced the chances of them sinking.

A 6594th Aerospace Test Wing welcome brochure warned Sunnyvale newcomers to be prepared to pay as much as $100 per month for a furnished apartment and up to $115 monthly for an unfurnished home. Uniform of the day was optional for officers; i.e., civilian or military wear (until May 1964). Airmen wore duty uniforms and everyone donned Class A's each Friday.



Twin Vela nuclear detection satellites first launched in October 1963 provided the U.S. with the capability to detect nuclear detonations in the atmosphere or in outer space. Each vehicle weighed about 300 pounds, measured five feet in diameter, and employed solar cells for power requirements. Developed and produced by TRW Systems Group; launched by Space Systems Division.

December

Construction began on the FM/FM Telemetry Ground Station at Shemya, Alaska. Annette station equipment was used to save time and money. The Shemya receiving station was temporarily installed in a Navy hangar to satisfy a special project requirement with a shelter and radome following later. Operations and maintenance were assumed by General Electric after checkout by Philco around 20 April of 1964.

The Hawaii Tracking Station received five motor generator sets ranging from 20 to 300 kilowatts. The unit was reorganized using Air Force officers as controllers bringing the squadron strength to 13 officer and 55 airmen authorizations along with a total of 178 Lockheed contractor authorizations.

4 December

Three modified CH-3B helicopters were delivered to the 6593rd Test Sq (Special) replacing H-21's. The CH-3B's had a 350 nautical mile operating radius in comparison with the H-21 version's 200 nautical mile operating radius.

10-16 December

Secretary of Defense Robert S. McNamera assigned responsibility for development of the near-earth Manned Orbiting Laboratory (MOL) program to the Air Force. The first flight was tentatively planned for late 1967 or early 1968. General Schriever, AFSC Commander, assigned Space Systems Division responsibility for managing the entire military manned space effort, including the MOL Program and the unmanned glider flight test (ASSET) program.

MOL

15 December

The Vandenberg Tracking Station contract for Philco personnel was discontinued leaving only Lockheed contractor personnel assigned to civilian positions at the station.

28 December

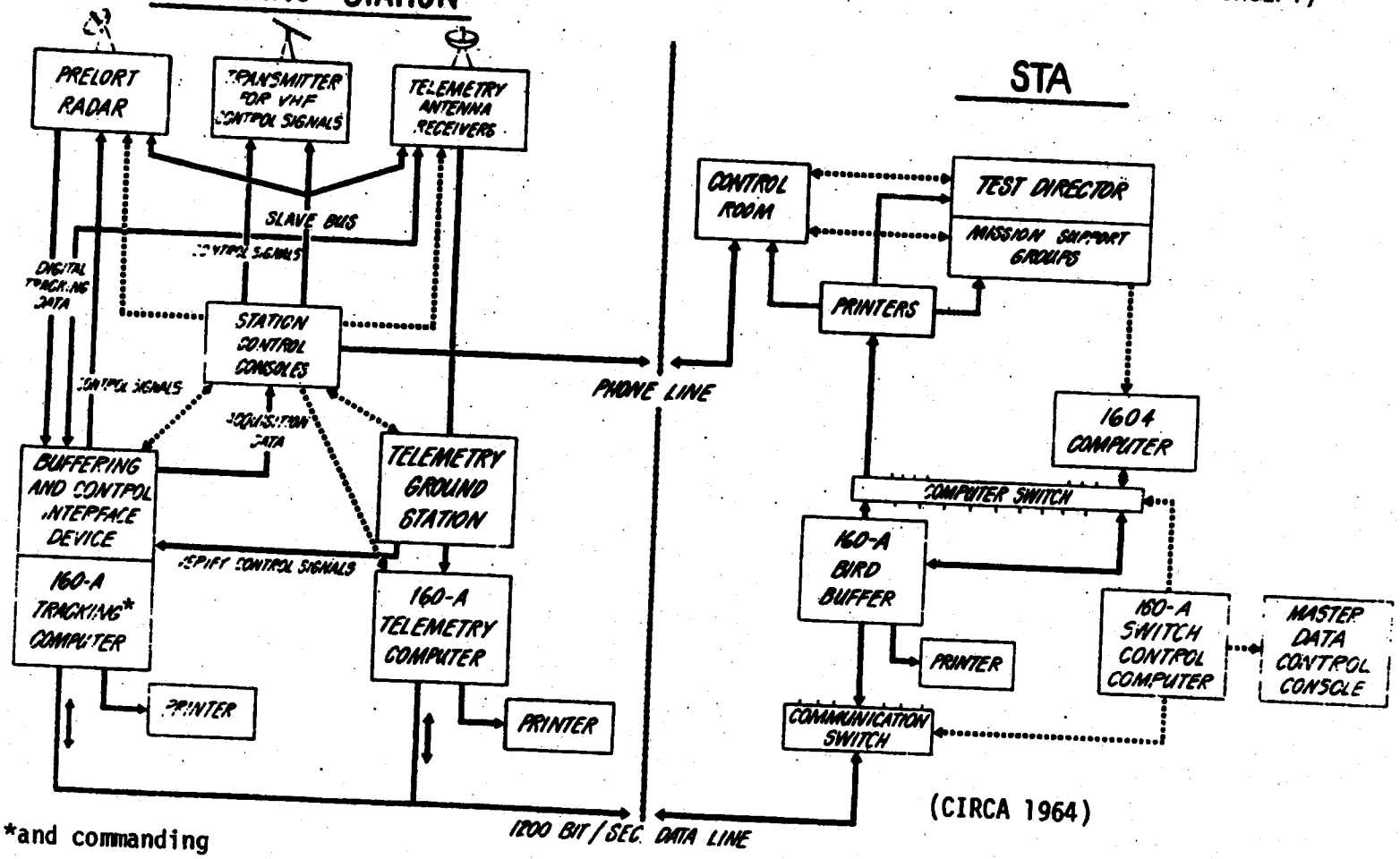
Twelve family housing trailers arrived at the Indian Ocean Station (IOS), from Malmstrom AFB, Montana.

SEQCM NOTE: MOL--no association with NRO

1964

January	Design was completed for a $1.6 million facilities modification alteration and building program for Kodiak to support the Multi-Satellite Augmentation Program (MSAP).
	The MSAP equipment installed at Thule Tracking Station was accepted by the Air Force.
January-June	The Vandenberg Tracking Station Verlort and data van were maintained in a standby status while MSAP equipment was phased in operationally. The CDC 1604 computer was removed; however, Programmable Integrated Control Equipment (PICE) remained in place although disconnected. At this time, tracking and telemetry data arrived at the STA in Sunnyvale via 100 wpm teletype or 1200 bps data lines. The PICE acted as "buffer" and as a storage and sampling device. Equipment included teletype and data line translators.
	The 6594th Aerospace Test Wing published Manual 375-1 which combined common operations procedures in a single document.
	Six recovery training capsules were fitted with Cook Electric Marker Buoy beacons and strobe lights to make them more realistic training aids.
2 January	Headquarters AFSC established the Headquarters National Range Division (NRD) at Patrick AFB, Florida. The Air Force Space Test Center was established at Vandenberg AFB. Headquarters NRD was formed to coordinate launch and range activities for both the Atlantic and Pacific Missile Ranges.
14 January	The PICE and 1604 computer at the New Boston (then New Hampshire) Tracking Station were removed in preparation for installation of MSAP Phase B equipment.
20-30 January	Lockheed proposed a two additional hook arrangement for the recovery system and successfully tested the concept. The Recovery Control Group's Test and Evaluation function subsequently recommended adoption of an added in-line hook configuration for the standard 78-foot loop.

SYSTEM DESIGN (OVERALL DATA FLOW CONCEPT)



*and commanding

February — The New Hampshire Tracking Station requested official acceptance of initial (Phase A) MSAP equipment. Problems with that equipment forced the station to maintain its Verlort and Prelort telemetry systems in an operational status until late May. The Angle Tracker, UHF Command Transmitter, van-mounted telemetry and timing components, and PICE were scheduled for phase-out as the new MSAP equipment became operational.

1 February — Space Systems Division was named Air Force executive for the Manned Orbiting Laboratory (MOL) spacecraft.

March — An SSD program change proposal outlined rationale for building a new satellite test center of 150,000 square feet to be located at Vandenberg AFB. The recommendation was made because the STA/Sunnyvale area was severely restricted with regard to future growth potential. Thus, even in early 1964, it was being officially documented that almost all of the 11.4 acres was occupied and that added parking spaces had been leased from Lockheed.

27 March — The access road to Kodiak was destroyed by the Great Alaskan Earthquake.

April — All satellite programs operated within the Data Systems Control sections were converted to the augmented data system. Conversion began in the second half of 1963.

The 6594th Aerospace Test Wing accepted Phase A MSAP equipment at the tracking stations. Phase B procurement was initiated for the Kodiak, Vandenberg, and Hawaii stations.

The former Research and Development Center became Los Angeles Air Force Station and the home of SSD. Both the center and former Navy Douglas facilities at the northwest corner of El Segundo and Aviation Blvds were transferred from industrial to command facilities.

May — A study group led by Colonel B.W. Hunsaker, Hq AFSC, recommended the reconsolidation of SSD and the Ballistic Systems Division at LAAFS with a Deputy Commander for Ballistic Missiles to be located at Norton AFB, California.

1 May — A new, semi-automatic teletype switch became operational in the STA Communications Center. Secure teletype circuits from the tracking stations terminated in that switch on typing reperforators. The system had six main tributary stations with 28 ASR teletype machines. Three other tributaries were available for spare equipment and internal comm center routing of administrative traffic. A "broadcast" feature allowed transmission to any one or multiple tracking facilities. With other capabilities, this system provided near real-time communications.

1-5 May — Installation of a Rixon Digital Generator permitted the New Hampshire Station's Crypto Section to generate its own data signal, send that signal on-line, and receive and evaluate the signal.

15 May — Headquarters NRD was organized at Hq AFSC. The Hq Air Force Space Test Center (Provisional) was inactivated at Vandenberg AFB and Hq Air Force Western Test Range was activated in its place. Headquarters Eastern Test Range was redesignated from "Air Force Missile Test Center" at Patrick AFB, Florida. Both ranges were assigned to Hq NRD as was the Satellite Test Annex at Sunnyvale.

20 May — Hickam AFB assumed responsibility for Hawaii Tracking Station facilities maintenance. Four personnel were authorized for assignment to the station on day shifts only. Previously, all maintenance had been handled on a case-by-case, on-call basis.

22 May — Operating Location #2 was activated at Shemya, Alaska.

June — One recovery aircraft and crew from the 6593rd Test Sq (Special) were deployed from Hickam AFB to Eielson AFB, Alaska, to assist Atomic Energy Commission in sampling upper air operations. Air Sampler was a 300-pound device towed aloft by a weather balloon to extreme altitudes. Released payload packages were recovered by squadron aircraft. The sampler resembled a trash barrel, hence the project's name "ASHCAN." The sampler and a two-chute tandem system were designed by the Edwards AFB Operating Location #1.

June — Installation of a high-frequency, high-power radio station at the STA was completed. Radio equipment was installed at the AF Communications Service transmitter/receiver sites at Davis and Lincoln, California. Audio and control circuits were connected from the sites to a technical control facility at McClellan AFB via microwave links. Interconnects to four-wire telephone links remoted the system from technical control to the STA. A remote control console at the STA controlled all important functions without assistance from maintenance personnel. The radio consisted of fourth generation Collins Universal Radio Group components capable of sending and receiving all four full independent voice channels on a duplex frequency basis. Each voice channel terminated in a transistorized telephone terminal unit which provided an interface between the radio and telephone systems. An elaborate antenna system was installed for high gain, directional and low angle radiation, with each antenna covering eight acres. The entire system was installed by Ratheon Corporation under Western GEEIA Region supervision.

14 June — Space Systems Division completed its move from Arbor Vitae to El Segundo. Facilities at the new location were declared operational on 15 June.

17 June — The Sacramento District Engineer opened bids to build a 25,000 square foot building addition on the north side of the STA. A contract was awarded to the Carl M. Swenson Company for $777,000 with work beginning 29 June.

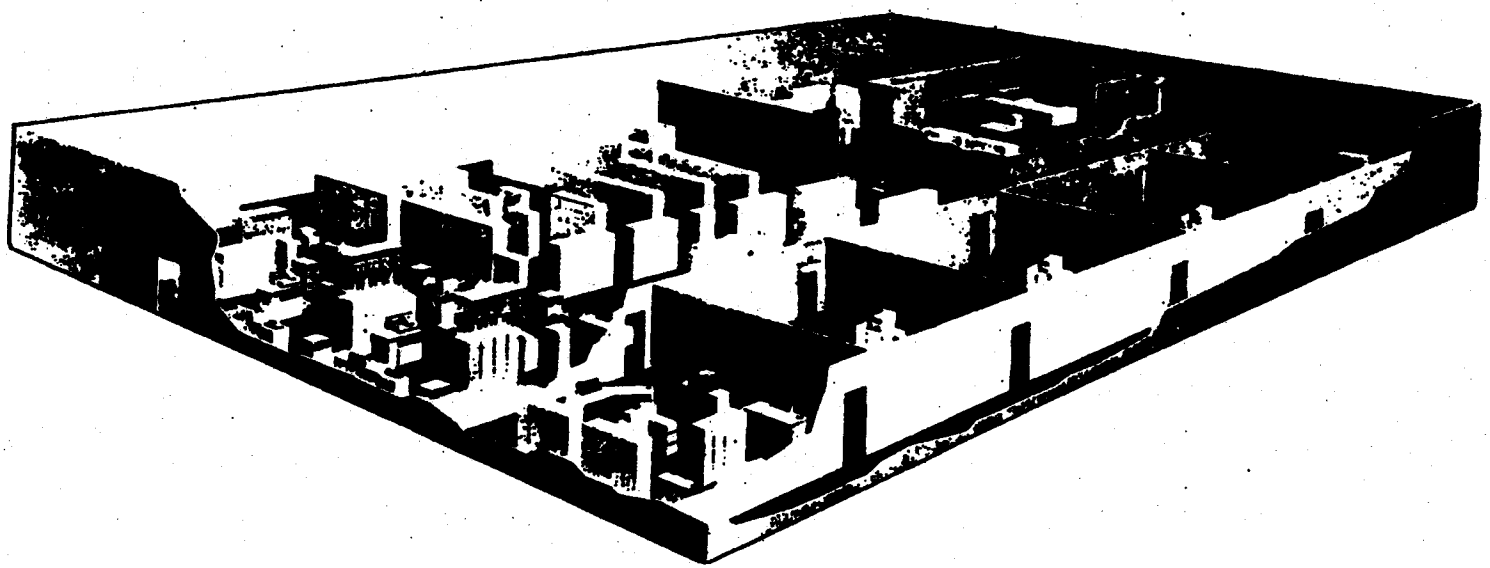
26 June — Lockheed Plant Engineering installed Univac 1040 computer system in three rooms of the STA for a cost of $42,000.

July — Installation of 600 post office boxes in Room 174 of the STA was completed. Also accepted at the STA were a 123-car parking lot and the lower portion of the 25,000 square foot administrative building addition. Two Vela satellites were launched making a total of four on-orbit. The long life span of the Vela spacecraft provided never before available information on the reliability of electronic components.

1 July — A four-month, fixed-price contract for the second phase of the Space-Ground Link Subsystem was awarded to Space Technology Laboratories and began on this date.

STC COMPUTER ROOM

(OVERALL LAYOUT - 1964)



July-December

Datafax terminals installed at the Kodiak and Thule station circuits to provide the STA with a new mode of communications began operating. Pictures of analog information were sent from those stations to the STA in near real-time, measuring 8½ x 11" and arriving within six minutes.

Despite problems resulting from the Great Alaskan Earthquake of 27 March, augmentation construction at Kodiak continued. A new ground station was installed in a remodeled data room about one-half mile from the former station. Radar control equipment for the Prelort tracking radar was also installed.

Phase C communications equipment was shipped to the Indian Ocean Station and installed. This shipment was the largest ever made to an Air Force tracking station from the Eastern Test Range with 906 pieces of cargo weighing a total of 868.79 long tons. Also arriving at IOS were 19 house trailers, some in poor condition since they had been deck loaded and damaged by storms at sea.

At the STA in Sunnyvale, additional lines (400) were required to increase the switchboard capacity to 1,000 lines. The telephone system then converted from a three to four digit dial system.

July-August

The 6593rd Test Sq (Special) supported Project ASHCAN at Eielson AFB, Alaska, flying six JC-130 missions for over 110 flying hours.

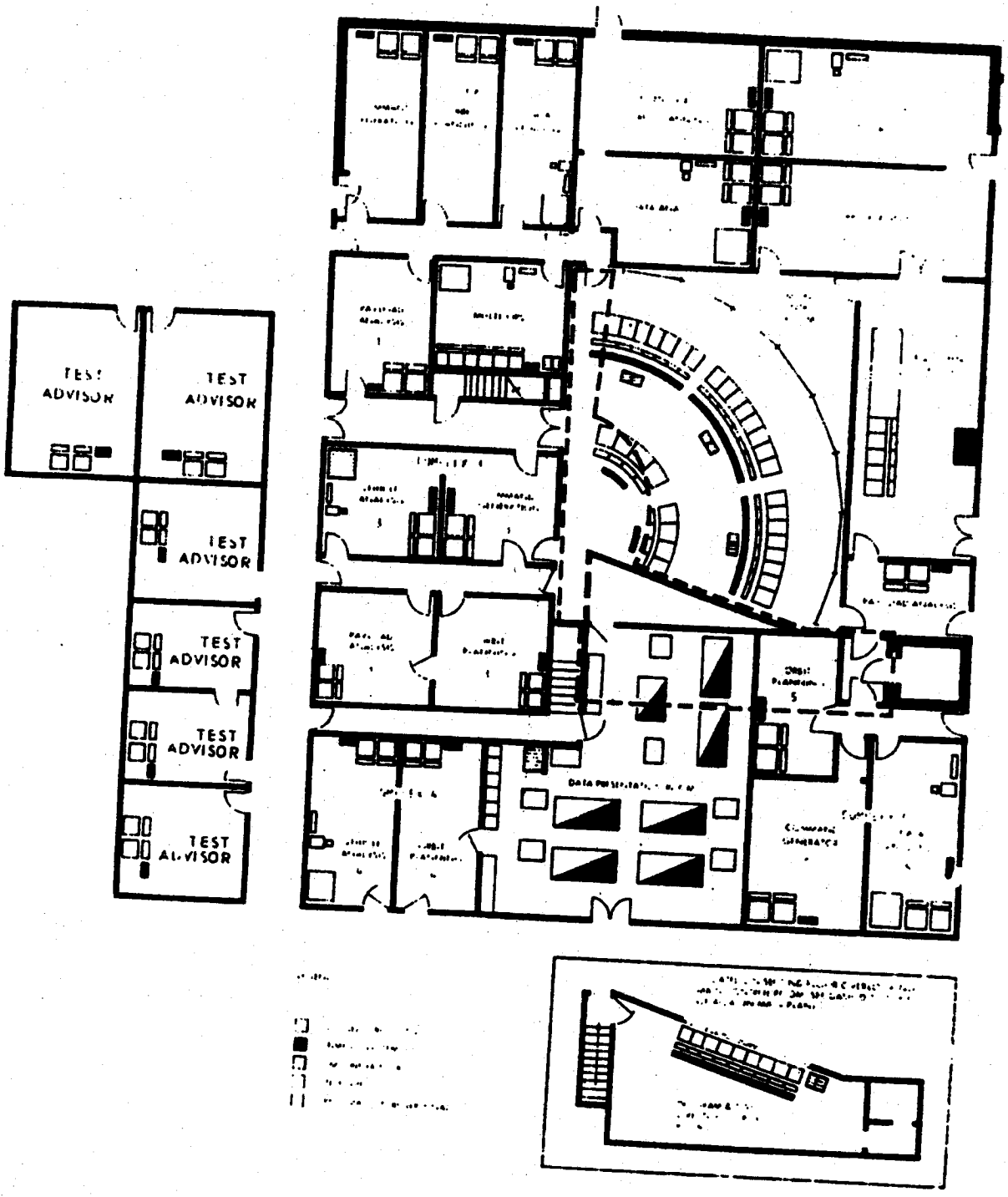
10 July

A reorganization within the 6594th Aerospace Test Wing resulted in formation of the Deputy for Test Engineering charged with planning, organizing, directing, and controlling assigned resources to provide optimum and timely orbital support from a test bed.

15 July

Defense Secretary McNamera announced negotiations with the Satellite Communications Corporation for a defense comsat system were terminated and directed the DOD to proceed with the full development of a military satcom system to be built by Philco-Ford. This would become the Initial Defense Communications Satellite Program (IDCSP).

9 August	NASA's Syncom III synchronous orbit comsat was launched into space and positioned over the Pacific where it would handle communications between Clark AB, PI, and Camp Roberts, California. During the next month, Syncom III was used for DOD military communications experiments between Saigon, Republic of Vietnam, and Hawaii.
September-Oct	A one-story Research and Engineering building was completed at Vandenberg Tracking Station for $300,000, adding 16,000 square feet to the facility.
14 September	The Kaena Point Missile Tracking Site was officially redesignated as the Kaena Point Satellite Tracking Station by Hq PACAF.
13 October	All PICE equipment was removed from Vandenberg Tracking Station.
22 October	With Phase B of the MSAP equipment installation accepted at the New Hamsphire Tracking Station, a dual tracking capability was achieved.
November	Due to an increasing requirement for added computing speed, more random access storage, and expandable core storage, a decision was reached to replace four CDC 1604 computers with five CDC 3600 computer complexes at the STA. The 3600 variety was selected since it met all criteria and was program-compatible with the 1604. Installation was slated to begin in July 1965 with completion by April 1966. A request for seven additional C-130 aircraft and three more CH-3B helicopters to meet increasing recovery workloads was sent to the Secretary of the Air Force and the Air Staff. A Mobile Tracking Station was authorized which would provide a satellite control capability at any required area of the world as either a total station within a net or as a backup at a site inoperative due to natural disaster or modification. Also available as a test bed for approved modifications, the Mobile Tracking Station was to be air transportable and capable of being made fully operational within 30 days of deployment.



1964 - STC CONTROL AREA

1 November	The main access road to Kodiak Tracking Station which was destroyed by the late March earthquake and tidal wave was made passable again. During the interim, an alternate resupply effort by air and sea proved inadequate to support MSAP objectives. Without a road, the Navy provided all station supplies via sea and air. Often the weather made resupply impossible and shortages developed. At one time the station was without gasoline for a three-day period and down to a one-day supply of meat. Personnel with families living in town used a bush pilot service to get to work and home again when weather conditions allowed.
28 November	Administrative/emergency housing was completed with an addition at Thule Tracking Station. The facility provided much needed office space, a kitchen, emergency housing, a training classroom, new heating system, and flush-type toilets plus a three-stall garage area for vehicle storage and maintenance.
December	At this time the STA utilized eight Bird Buffer systems and one control computer (all CDC 160-A's).
1 December	Two 1604 main frames were purchased by means of a purchase option contract with CDC for $594,000.
14 December	Modifications to all CDC 1604 systems were complete with obsolete 1607 tape units replaced by 606 tape units and the 088 card reader replaced by a 405 card reader.
21 December	The 6593rd Test Sq (Special) rescued a surfer less his surfboard being swept out to sea off Oahu's northwest coast.

1965

January-April	Both the Fort Dix, New Jersey, and the Camp Roberts, California, operating locations were inactivated. With full utilization of MSAP-B equipment supporting Program P-11, Program 241, and Snapshot, multi-satellite operations had become routine from the New Hampshire Tracking Station. Project ASHCAN continued to receive Recovery Control Group support recording five recoveries at Eielson and 13 recoveries in the Panama Canal Zone.

January-June

The Mobile Tracking Station (MTS) project used Annette Tracking Station equipment as its basic element. All MTS elements were configured in vans with the first operational requirement anticipated in September 1965.

Two portable Telemetry and Command stations were collocated with existing SCF network facilities at Mahe Island and Hawaii for supporting Syncom satellites. The Mahe station was operational on 11 February. A third Syncom station at Orote Point, Guam, became operational on 24 May.

Following a series of power failures at the STA which caused the loss of computational capabilities, two emergency operating locations were established. The first was a computer facility provided by CDC in Palo Alto for use only during short-duration power outages to provide normal communications between the STA and the tracking stations. A second OL involved relocation of operational functions within the STA to the offices of the Systems Data Corporation at Santa Monica, California, to provide test control, analysis support, and data processing.

During the first few months of 1965, the Mission Control Complex (MCC) concept was developed and approved. All elements of program control were consolidated in single centers with the first MCC established in Complex #5 to serve as a test for the idea.

A self-contained 2-digit dial system was installed for the ACES and became operational. It had the capability of 100 station lines and eight simultaneous conversations. The former system was limited to two simultaneous conversations and had a 36-line capability. The new system provided complete inter-communicating capabilities with all computer functions supporting real-time satellite flights.

1 January

The Eastern Test Range became responsible for base support of the Indian Ocean Station. Pan American World Airways was the prime contractor for the project which previously belonged to Philco-Ford.

NASA transferred operation of Syncom II and III synchronous satellites to the Defense Department which had provided the communications ground stations for the program.

12 January

The Air Staff allocated five more C-130 aircraft to the 6594th Recovery Control Group: three being new, more powerful HC-130H ARS long-range types; and two being C-130B models from Tactical Air Command. All were modified by the Warner Robins Air Materiel Area with All American Engineering Company Aerial Recovery Equipment and new Cook Electric Company miniaturized direction finding systems.

A new access road to Thule Tracking Station was opened for vehicular traffic. The former access road had been more hazardous and was often closed during high wind conditions.

28 January

Verlort data vans were permanently removed from the Vandenberg Tracking Station after more than six years on station. (Vans were transferred to the Atomic Energy Commission.)

29 January

A Syncom II telemetry van was delivered to the Indian Ocean Station. Hughes Aircraft employees cross-trained Philco-Ford technicians on operations and maintenance of the Syncom equipment. A makeshift antenna was mounted on a Syncom antenna cherry-picker prior to the arrival of the intended antenna in June.

1 February

The Corps of Engineers accepted the 25,000 square foot, Carl N. Swenson & Company administrative addition to the STA.

Operations of the USNS Longview and USNS Sunnyvale were assumed by the Air Force Western Test Range from the Navy's Pacific Missile Range. Operations control was delegated to the 6594th Recovery Control Group. Navy helicopter support of the USNS Sunnyvale was withdrawn.

February-June

A contract for modifications associated with installation of CDC 3600 computers was let by the Corps of Engineers to the Chamberlain Construction Company at the cost of $342,000. First phase beneficial occupancy was achieved on 29 June 1965.

4 February

The Air Staff allocated three CH-3B helicopters to the Recovery Control Group with modifications by Sikorsky ($361,500) with internal fuel tanks for more range, special flotation gear, doppler navigation equipment, SSB radios, more batteries, and other mission equipment.

10 February — Installation of an equipment van pad, antenna pedestal, cable tray, and utility/power connections for the Syncom program were completed at Kodiak Tracking Station.

19 February — The Director of Aerospace Instrumentation agreed to procure five modular telemetry subsystems for use on JC-130 aircraft to provide a capability to record an entire telemetry link, to demodulate, and to display up to six FM/FM channels.

March — A Philco-Ford installation team began assembling "Augie" (augmentation program) Prelort radar at the Vandenberg Tracking Station.

3 March — General Bernard A. Schriever, Commander AFSC, announced plans to develop a wingless, maneuverable reentry vehicle as a follow-on to the ASSET program. The new vehicle, under SSD management, was part of the Precision Recovery Including Maneuverable Reentry (PRIME) program. Both PRIME and ASSET programs were part of the larger Spacecraft Technology and Advanced Reentry Test (START) program.

18 March — Soviet Cosmonaut Leonov became the first man to walk in space spending 12 minutes and nine seconds floating outside his spacecraft to which he was connected by a 16-foot cord of nylon material.

23 March — Astronauts Virgil Grissom and John Young were launched from Cape Canaveral on a three-orbit mission (Gemini 3) in the first of the manned Gemini series. During that initial mission, the spacecraft was maneuvered in orbit, changed its orbital path, and both represented "firsts" in space achievements.

April — The STA switchboard was expanded to five positions.

Microwave and teletype/voice wire operational circuits were installed between VTS and Santa Monica as part of an emergency backup system for primary operational communications lines. Also, a new operational voice circuit was established between Vandenberg Tracking Station and the STA as part of the MSAP program, Phase B.

1 April — The U.S. Navy withdrew helicopter support for the USNS Longview and the USNS Sunnyvale was modified to permit operation of CH-3B helicopters.

3 April — A Snapshot vehicle (SNAP 10-A) carrying an onboard nuclear reactor to generate electricity for its ion engine, marked the first attempt to test a reactor ion system in orbit. Additional payloads included an impedance probe, erosion gauge, density gauge, micrometeorite detectors, and an ionosphere beacon. The SCF provided complete tracking and telemetry support for 45 days.

A mobile clothing sales van reported over $1,200 in sales to SAFS personnel during a recent visit. Hamilton AFB announced that the van would be scheduled for quarterly trips in the future.

21 May — A host-tenant agreement between the 6594th Aerospace Test Wing and the 3960th Support Wing (SAC), Anderson AFB, Guam, was concluded for the Mobile Tracking Station (OL-10), at Northwest Field.

June — The USNS Longview received modifications to support CH-3B helicopter operations.

Support studies showed that the Manned Orbiting Laboratory (MOL) program should use the SCF for network support with a MOL Control Center to be located within the STA.

A Flat Plane Array antenna system replaced the Disc-on-Rod system at Kodiak Tracking Station.

3 June — In the Gemini 4 spacecraft, Astronauts McDivitt and White were launched on a near 98 hour flight during which White became the first American to "walk" in space.

18 June — Headquarters ARDC officially approved the title "Satellite Control Facility" for a new organization to be created from the merger of the SSD's Deputy for Space Test Operations and the 6594th Aerospace Test Wing.

July — Syncom ground stations arrived at Guam and Hawaii Tracking Stations. Guam had two trailers and an antenna which were moved to the tracking station in November, thereby consolidating all SCF facilities on the island.

The Air Force Western Test Range assumed the functions of the U.S. Navy Pacific Test Range at Point Mugu Naval Station.

Construction began on the Vandenberg Tracking Station Space-Ground Link Subsystem (SGLS) building.

1 July

Colonel Walter H. Hedrick, Jr., replaced Colonel William K. Kincaid as AFSCF Commander.

Direct dialing telephone communications were established between Space Systems Division (SSD), Vandenberg Tracking Station, and the Satellite Test Annex.

Headquarters Air Force Satellite Control Facility (AFSCF) was designated and organized at Los Angeles AFS, and assigned to SSD. Det-1, AFSCF, was designated and organized along with the 6594th Support Group at Sunnyvale. Colonel Hedrick was Commander of Det-1. Headquarters 6594th Aerospace Test Wing at Sunnyvale, and the previous "Det-1" at Donnelly Flats, Alaska, were discontinued. Former test wing units which transferred to the new AFSCF, were: 6594th Instrumentation Squadron (INS); 6596th INS, the 6594th Recovery Control Group; and the 6594th Test Squadron. Thus, by the end of the month, all geographically separated units and six Hq AFSCF directorates reported directly to the AFSCF Commander. This realignment was directed "to create an efficient, flexible organization capable of performing all satellite control functions."

July-December

Facility modifications for the SGLS began at the Vandenberg Tracking Station and Thule Tracking Station both having been designated "demonstration ground stations."

A site survey team examined Atlas F and Titan I sites at three locations for "Mole Hole" installation. Mole Hole was the nickname for a program concerning development of hardened remote tracking stations and/or a control center located within the continental U.S.

In one STA complex, a CDC 8032 digital-to-analog conversion system was installed providing visual display and permanent recording of selected parameters in real-time. Inputs to the system came directly from the tracking stations via CDC 160-A computers.

The Hawaii Tracking Station began deactivating its inactive non-MSAP equipment.

The 6594th Test Squadron Photography was established as an Air Force Special Projects Production Facility and assigned to Space Systems Division.

23 July

Syncom equipment installation was completed at the Kodiak Tracking Station.

August

Fort Greely Tracking Station began modifications necessary to support Program 461.

The first two of five CDC 3600 computer systems were installed at the STA signaling the beginning of CDC 1604 model replacement.

The first JC-130H aircraft was delivered to the 6593rd Test Sq (Special). The "H" model provided greater fuel capacity, increased range, and a capability to transport more weight than the prior "B" model.

1 August

A four-channel microwave system between the Vandenberg Tracking Station (VTS) and Range Telemetry Central (RTC) at Vandenberg AFB was completed. The system had four links from VTS to the RTC and three links from the RTC to VTS for subsequent relay to the STA via existing capabilities with the Western Union wideband telemetry system.

3 August

Final tests were concluded with the 6-hook "T" recovery loop by the 6594th Recovery Control Group. The "T" loop proved as capable as, but not superior to, the operational loop in use. As a result, the extant loop was retained.

18 August

A Communications-Electronics Implementation Plan (CEIP) to install AN/MSC 46 communications satellite (IDCSP) ground station was submitted to AFSC to improve communications between the Indian Ocean Station and the STA. The request was disapproved due to a lack of adequate funding.

25 August

President Johnson announced that he had approved the DOD plans for MOL development at a cost of $1.5 billion. The Air Force was to continue its management of the MOL Program. Douglas Aircraft Company was to design and build the spacecraft to be placed into orbit using a Titan IIIM version of the Titan IIIC space launch vehicle.

27 August

The AFSCF was asked to consolidate and update all previous studies on moving the STA or expanding at Sunnyvale. General Schriever received an informal presentation on the subject and a decision was made to expand current facilities.

30 August — Having reached a decision to expand current facilities at Sunnyvale rather than move the STA elsewhere, an interim expansion plan was completed and revised later somewhat to reduce costs.

31 August — The Secretary of the Air Force named General Schriever as Director of the Manned Orbiting Laboratory (MOL) program in addition to his duties as AFSC Commander.

September — A Muirhead 300A automatic satellite picture recorder was installed at the STA in the weather office and connected to a Tiros/Nimbus readout station at Vandenberg AFB, California. Photographs from each satellite pass were sent to the STA weather facility and reproduced on the recorder.

Four circuits were activated between the STA and Guam; two data, one voice, and one teletype. All four were routed through the Trans-Pacific cable for $85,864 per month.

2 September — The Hawaii Tracking Station assumed the workload of a phased-out South Point Tracking Station after modifying its TLM-18 antenna to accept a 136 Mhz signal.

17 September — The Guam Tracking Station (GTS) was activated at Anderson AFB, Guam, as OL-10. It was configured in a van complex and represented the SCF's first attempt to provide a complete command tracking and telemetry capability in a mobile facility. The complex had nine technical, seven power, one maintenance, and seven administrative support vans. Site selection was completed the prior April; construction began on 2 July; and technical vans arrived on 2 September.

22 September — The alternate satellite test center became fully operational at Santa Monica, California.

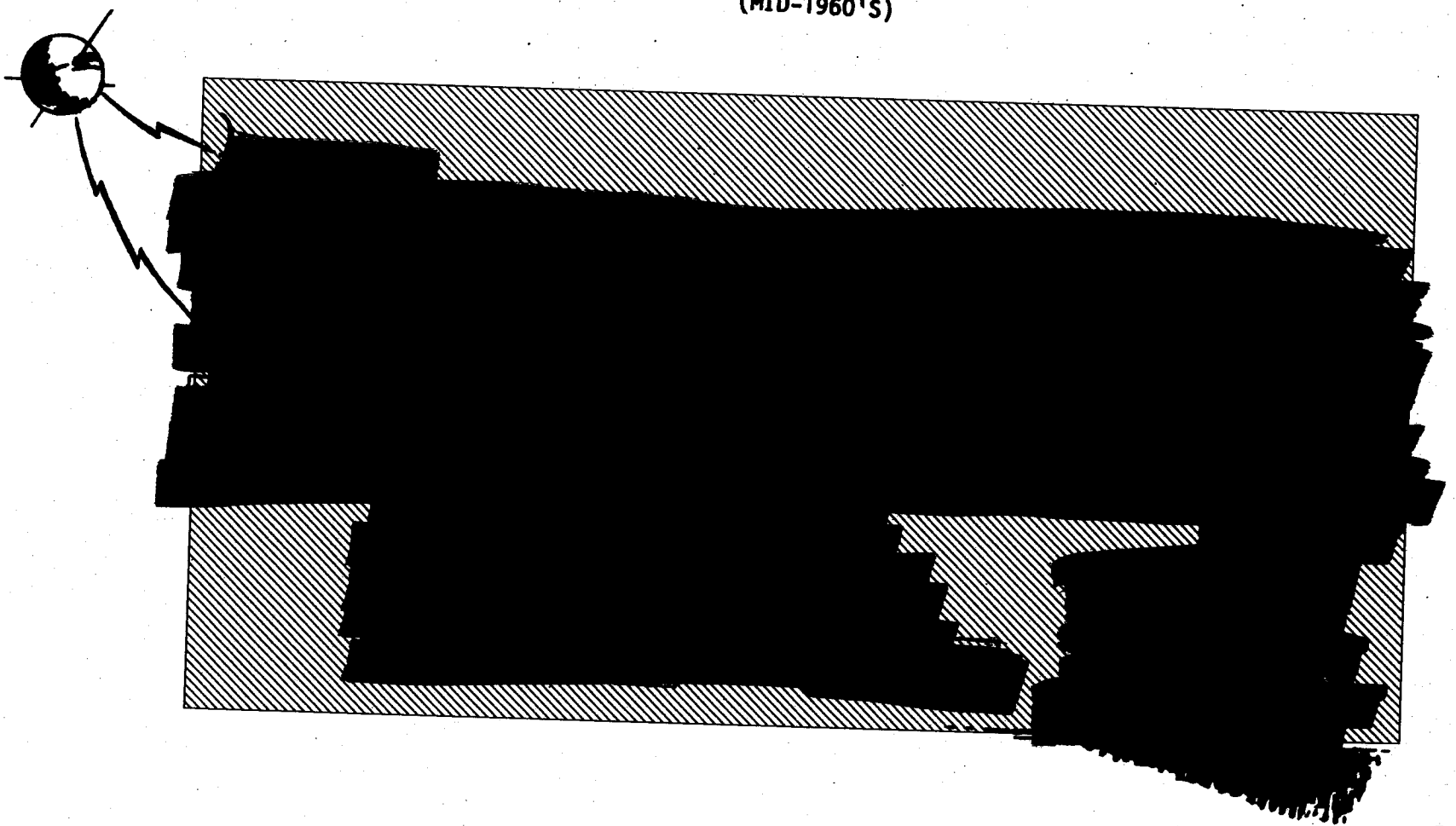
The first of many subsequent Bird Buffer CDC 160-A memory upgrades were made to increase the capability from 16 to 24K.

Direct dial access was installed in the Satellite Test Annex linking the STA with the Space Systems Division.

After concluding that the MARS station was not being used sufficiently to continue its operation, and with inadequate equipment, the station at the STA was closed.

TYPICAL TRACKING STATION CONFIGURATION

(MID-1960'S)



October	Two CDC 1604 computers were removed from the STA.
	The first of several subsequent Bird Buffer CDC 160-A memory capacity upgrades occurred increasing the size from 16K to 24K.
	Direct dial access was installed between Space Systems Division in Los Angeles and the STA at Sunnyvale.
10 October	The MARS station at Sunnyvale was closed due to a lack of adequate interest to sustain operation and inadequate equipment.
	By this time the 6593rd Test Sq (Special) had received two more new JC-130H aircraft giving the unit a total of 10, JC-130B's; three C-130H's; and six CH-3B helicopters.
13, 14 October	The first of many AFSCF Commander's Conferences was conducted at Los Angeles. The event became an annual tradition.
27 October	The Space-Ground Link Subsystem (SGLS) contractor delivered SGLS demonstration ground station equipment to Vandenberg Tracking Station.
29 October	Aircraft and crews from the 6594th Recovery Control Group performed the first successful recovery of an Air Launched Recoverable Rocket (ALARR) since that program began in the spring of 1964. The group flew JC-130B aircraft and logged 50 hours in support of ALARR between July-December 1965.
November	The Integrated Commanding System (ICS) for the Phase B MSAP program satellite operations center (SOC) was installed at Vandenberg Tracking Station with testing scheduled through the end of the year.
2 November	Interim STA expansion began by essentially adding four mission control complexes (MCC's) to function as the central control point for monitoring, coordination, and supervision of the network. The plan called for extensive modifications to the operations building, standardization of MCC layouts, and an increase in the switching capacity for added output display devices.

17 November	In response to a request from the Deputy Director for the MOL program, the AFSCF submitted a position paper on the use of the STA facilities versus the NASA Manned Spacecraft Center in Houston to support manned military space operations. The paper pointed out wide differences in mission support capabilities, concepts, and configurations between NASA and the AFSCF.
December	A third CDC 1604 computer was removed from the STA.
	A total of 21 entries were received in a contest conducted to select an AFSCF organizational emblem.
3 December	In the Seychelles, British Colonial Secretary Greenwood announced that Britain had agreed to construct a civil airfield in the islands providing links to India and Africa. The airport was also projected as a significant boost to the economy of the Seychelles.
9 December	The final design for the interim STA expansion was completed.
15, 16 December	Gemini 6 was launched and rendezvoused with Gemini 7 on the first such mission in the U.S. space program. In addition, astronauts from Gemini 6 performed the first controlled reentry to a predetermined landing point in the program.
19 December	A telecommunications program objective was sent up the chain-of-command from the AFSCF which described a plan for a feasibility test of the Initial Defense Satellite Communications System (IDCSS) between the Indian Ocean Station and Antigua.
28 December	Philco-Ford employee Martin Shreidan was admitted to the Seychelles Victoria Hospital with paralysis of the legs diagnosed as Type I Polio. All Indian Ocean Station personnel and local hire employees received oral polio vaccine unless otherwise vaccinated. At this time the Seychelles reported several cases of polio annually.

1966

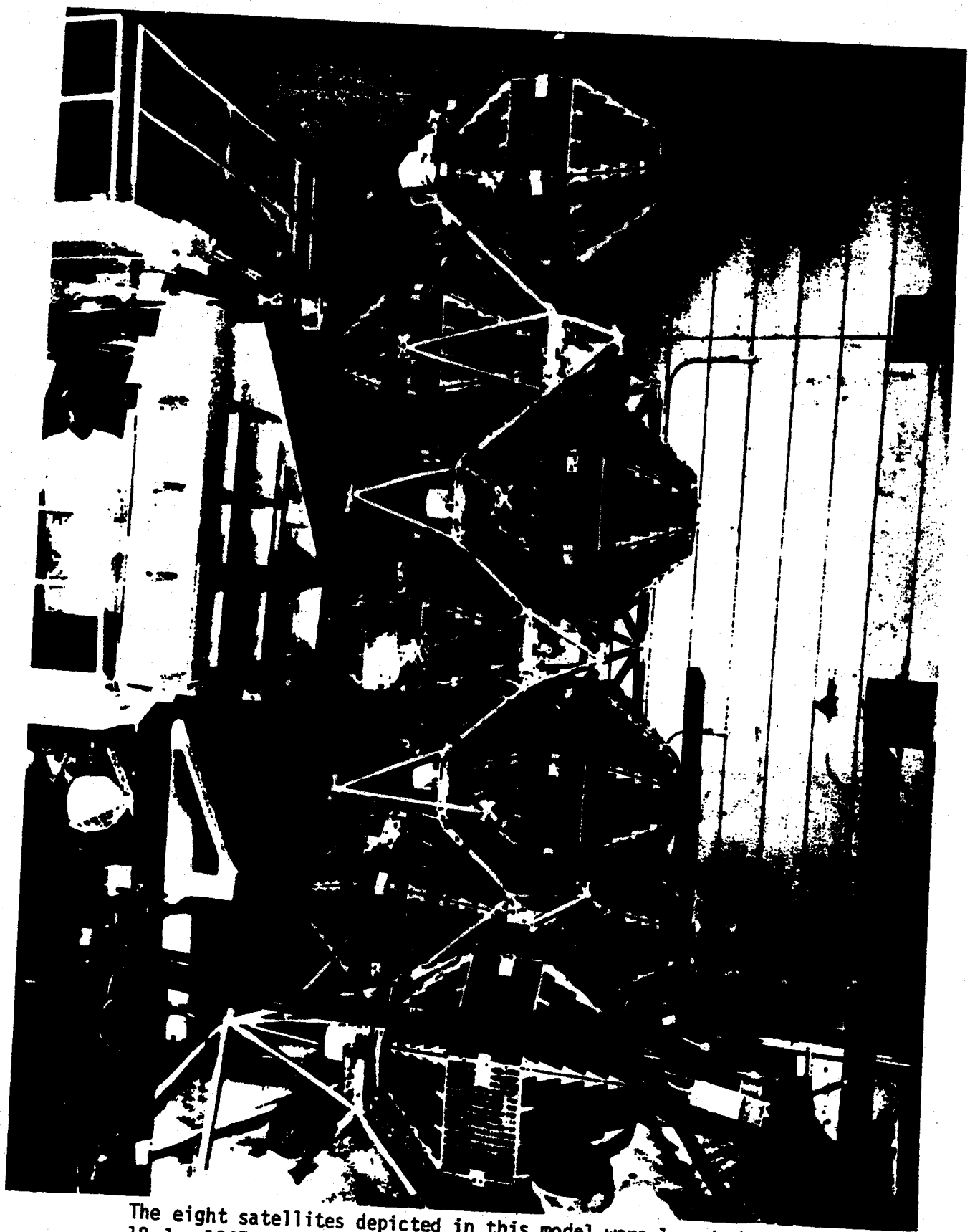
January	A third CDC 3600 computer was installed in the STA.
	The Calibration Satellite (CALSAT) program was devised to provide calibration of the SCF's tracking network and readiness activities such as equipment and software checkout, joint SCF and NRD exercises, prelaunch readiness checks, etc.
12 January	Designed for newly assigned personnel at the SCF and its tracking stations, the "Training and Checkout, or TACO" program was initiated to extend the useful life of SCF vehicles by assigning obsolete satellites for training and equipment checkout purposes.
8 March	The National Security Agency (NSA) was briefed on the MOL program with the AFSCF acting as an interface between that program and the agency.
10 March	The 6594th Recovery Control Group was redesignated as the 6594th Test Group with no change in station or assignment.
16 March	In Gemini 8, astronauts David R. Scott and Neil Armstrong performed the first American space-docking experiment with an unmanned Gemini Agena Target Vehicle.
25 March	Phase B of the MSAP was operational at the Hawaii Tracking Station with full support capabilities for Air Force satellite programs.
28 March	The fourth CDC 3600 computer was accepted for operational use at the STA and the last CDC 1604 computer was on its way out.
31 March	A contract was let to convert AFSCF timing to the Inter-Range Instrumentation Group formatted time codes according to DOD/National Range Division directives. Joint goals included all remote tracking stations and the STA to be converted by June 1967 to improve accuracies and correlation techniques.
6 April	Fort Greely, Alaska, became operationally ready as Operating Location #8, Donnelly Flats, Alaska.
28 April	Of the four CDC 3600 computer systems turned over for operational use at the STA by the end of the month, only one system remained to be turned over in order to complete the replacement of CDC 1604 models.

May — Work statements and design specifications for procurement of 110-foot radomes were initiated for the Hawaii, Guam, and Vandenberg Tracking Stations.

30 May — The NASA Surveyor I spacecraft was carried to the moon on an Atlas/Centaur vehicle in the first of a series of seven Surveyors designed to develop soft-landing techniques and provide basic scientific and engineering data supporting Project Apollo. On 2 June, Surveyor soft-landed on the moon and became the first U.S. spacecraft to do so and to transmit television pictures back to the Jet Propulsion Laboratory, Pasadena, California.

16 June — A Titan IIIC placed eight satellites into near-synchronous orbits 18,200 miles above the equator. Seven represented the first military comsat system, the Initial Defense Satellite Communications System (IDSCS). Each of the 36" x 32" satellites could relay 600 voice or 6,000 teletype channels. (The eighth vehicle in the launch was a gravity gradient test spacecraft.) The "A" side of the Vandenberg Tracking Station simultaneously supported one satellite while the "B" side supported the remaining satellites further demonstrating multiple operations support from a single AFSCF tracking station.

July — After about nine months of in-residence examination of operations and contractor personnel utilization at the STA, the GAO advised that contractor employees in O&M areas of the STA represented a form of personnel procurement not authorized by law. Irregularities involved an intra-mix of military and contractor personnel, i.e., performance of like functions, contractors working under Air Force supervision, and vice-versa. Three tracking stations (HTS, VTS, and NHS), were also noted as failing to meet the criteria of legality. An implementation plan correcting the irregularities was developed by the AFSCF and SSD then approved by Hq AFSC on 9 April 1968 leading to a reorganization of the AFSCF.



The eight satellites depicted in this model were launched on 18 Jan 1967 forming the second portion of the on-orbit Initial Defense Satellite Communications System (IDSCS) constellation. A Titan IIIC was also used to launch the first seven IDSCS vehicles into orbit on 16 Jun 1966.

July-December	The Integrated Commanding System (ICS) became operational at the SCF for real-time selection of command source, verification source, and transmitter configuration. Installation of the first five cathode ray tube (CRT) devices was completed at the STA as alternatives to the existing computer printer displays. Multi-operations were begun using the Scheduling Control and Resource Allocation Buffer Link (SCRABL). The SCRABL evolved from a "SCHOPS" program used since January 1964 to prepare all SCF schedules, flight and non-flight activities. It did not schedule computers within the STA nor installation, checkout, or maintenance activities. As part of the augmentation program, SCHOPS evolved into SCRABL via technical inputs made in early 1965 to Systems Development Corporation and the Aerospace Corporation. The result was a centralized scheduling program (SCRABL) for the addition of station downtime, equipment modifications, and computer operations, to operations support inputs. These were incorporated into a single, 90-day forecast, 30-day schedule and a final, more detailed, 7-day schedule in which conflict resolution was accomplished.
9 July	The fifth and final CDC 3600 computer system was accepted by the AFSCF's Data Systems Office.
Aug-September	Vandenberg Tracking Station "A" and "B" computer complexes were turned over to the Air Force thus giving that station multiple satellite support capabilities having installed and demonstrated the SGLS.
31 August	General Bernard A. Schriever, AFSC Commander, retired after 32 years of military service. He had played a pivotal role in guiding development of the Air Force ballistic missile and space programs.
1 September	Colonel William G. King, Jr., assumed command of the AFSCF replacing Col Walter H. Hedrick, Jr.
19 September	Secretary of Defense McNamera and Lord Shackelton (U.K.), approved implementation of an agreement calling for the U.S. to design, develop, fabricate, and launch two synchronous comsats for the interim U.K. operational defense satcom capability as part of the IDSCS program. The project later became known as "Skynet."

21 December	The first Precision Recovery Including Maneuvering Reentry (PRIME) vehicle was launched to explore and advance development of possible future manned and unmanned lifting body vehicles that would have the capability of operating like a spacecraft in orbit while being able to fly and maneuver like an aircraft in the sensible atmosphere. Research would be applied later to the Space Transportation System's technology.
31 December	A formal agreement was signed between the United States and the United Kingdom concerning the Indian Ocean Station, Mahe Island, Seychelles, with public announcement following on 25 April 1967.

1967

January	The 6593rd Test Squadron (Special) supported its final ASHCAN mission and the project was transferred to the Aerospace Rescue and Recovery Service (ARRS).
11 January	Space Systems Division selected Hughes Aircraft Company as the contractor to proceed with research and development of the experimental communications satellite for all U.S. military services. This project led to what became known later as the Tactical Communications Satellite (TACSAT).
18 January	Another eight IDSCS satellites were placed into orbit resulting in a total of 15 on-orbit vehicles in the system.
27 January	Astronauts Grissom, White, and Chaffee, training for the first Apollo flight, died when a flash fire swept through their command module as it sat on the ground. It was NASA's worst accident to date. Four Soviet cosmonauts were known to have died in space accidents along with an unknown but probable number of others.
February	A housing survey in the Sunnyvale area revealed that station personnel were paying from $50 to $200 more per month than their current quarters allowance.
8 March	The contract for the Skynet defense comsat (part of IDSCS) was awarded to Philco-Ford by the Space Systems Division.
April	Equipment comprising the former Sunnyvale MARS station was relocated to Hamilton AFB, California. The station at Sunnyvale was closed in October 1965.

12 April — The AFSCF's official emblem was approved by Hq USAF adopting both the motto and emblem (with minor revisions) of the former 6594th Aerospace Test Wing.

28 April — Two new and heavier (498 pounds) Vela nuclear detection satellites and three scientific satellites were placed into orbit from Cape Canaveral. The Vela vehicles joined six other Vela spacecraft on vigilant duty some 69,000 miles above the earth.

1 May — A contract was let for the first portion of an Advanced STC project representing a totally new data handling system, new display system, new communications system, and new support systems. One portion of the effort, the Expanded Communications Electronics System (EXCELS), would replace a manual communications system with an automated, centrally controlled, data-serviced subsystem designed to interface with and use "Advanced Data System" capabilities. The ADS, another feature of the Advanced STC project, provided for an IBM 360/67 triplex computer system at the STC; Univac 1230 military tactical computers at the tracking stations; and a control and display subsystem at at the STA with an EXCELS interface and supporting software. Other major components of the ADS effort included CDC 3800 computers and telephone systems. The Advanced STC concept provided for establishing a single operational entity with a network control center charged with control over the SCF and support for all MCC's. All services provided to one MCC would be available to other MCC's regardless of their location. Implementation of the SGLS and ADS would provide a standard simplified ground environment for supporting existing and future space systems. Under this project, the former and advanced STC versions would be tied together physically and electrically, but most importantly, functionally and procedurally.

12 May — Bids were advertised for a permanent Guam Tracking Station to replace the mobile tracking facility. Bidding began on 26 June and a low bid of $1.6 million was obtained. Occupancy was scheduled in late August of 1968.

15 May	Lockheed Missiles and Space Company was awarded a contract for the Advanced Data System (ADS) with a target cost of $36 million to provide satellite operations support for the 1970-1975 time period.
28 June	Two scientific satellites (one Army, one Navy), were launched as the first flight in the DOD Space Experiments Support Program (SESP). This was a tri-service effort allowing qualified government-sponsored space experiments to fly payloads on Air Force boosters under management of the Space Systems Division.
29 June	Final approval was obtained to acquire seven CDC 3800 computer systems to replace the 3600 models during the major data systems upgrade, Advanced STC project.
July-December	The National Range Division (NRD) was disbanded with the AFSCF maintaining contact with ranges through Headquarters AFSC.
1 July	Functions and personnel of SSD and the Ballistic Missile Division were combined to form the Space and Missile Systems Organization (SAMSO) to which the AFSCF was reassigned.
	Three of six satellites launched from Cape Canaveral completed the IDSCS on-orbit constellation, later known as the Initial Defense Communications Satellite Program (IDCSP).
31 July	Brigadier General Jessup D. Lowe assumed command of the AFSCF replacing Colonel William G. King, Jr.
21 September	Plans to acquire and install 40-foot antenna in place of 14-foot antenna at the SCF, VTS, HTS, and NHS were sent to Hq AFSC for a high gain antenna capability acquisition. This plan was related to the PCM ground station operations portion of the Advanced STC project.*
November	The DOD directed SAMSO to procure a comsat system for NATO essentially duplicating the U.K. Skynet comsat system developed and built by Philco-Ford.
1 November	Fort Greely, Donnelly Flats, Alaska, was placed on caretaker status and inactivated.

* Note: The ADS, SGLS, PCM, and EXCELS projects were all developed to meet an increasing amount of operational requirements for the AFSCF, and collectively, they represented an integrated effort to expand SCF capabilities.

1968

January-June	Congress released funds for constructing the "Advanced STC" and an associated power plant at Sunnyvale following site development which began on 4 October 1967 with completion in April 1968. Site development for what is now Bldg 1003, included more parking; a re-routed traffic flow; demolition of streets, curbs, sidewalks; and the relocation of underground utilities.
28 January	The AFSCF received its first Air Force Outstanding Unit Award (AFOUA). It covered the period from 1 January to 31 December 1967.
April	Space and Missile Systems Organization initiated procurement of a two-satellite system for NATO.
13 April	Installation of SGLS equipment began at the Hawaii Tracking Station.
1 May	Hughes Aircraft Company and TRW Systems Group were awarded contracts by SAMSO to prepare preliminary designs for a navigation satellite system for providing precise navigation using high-speed aircraft (System 621B).
13 June	An additional eight, 100-pound comsats were launched into near-synchronous orbits increasing the size of the on-orbit constellation of IDCSP vehicles.
27 June	Installation of SGLS equipment began at Kodiak Tracking Station.
12 August	High resolution, closed-circuit television systems became operational in MCC's 2, 3 and 4.
7 September	The first SGLS-configured satellite was tracked with the SGLS system.
26 September	Of four satellites launched on this date, the primary payload was a Lincoln Experimental Satellite (LES-6). It was the second all-solid-state, UHF band comsat to be placed in a synchronous orbit. The satellite was used to test communications between aircraft, ships, and ground forces.

8 October — Qualified contractors were asked by SAMSO to submit their proposals for development of an advanced system for satellite communications known as the Defense Satellite Communications System Phase II (DSCS II).

11 October — The first U.S. manned flight in the Apollo Program was launched. Apollo 7 and its three astronauts orbited the earth for 10 days during which the first American telecast from space was recorded.

21 December — The "Christmas flight" around the moon began for a six-day mission by Apollo 8. Three astronauts circled the moon 10 times taking pictures of that body and the Earth which were beamed back on television broadcasts.

1969

14 January — The 6593rd Test Sq (Special) used CH-3B helicopters to evacuate 20 critically burned seamen and three medics from the USS Enterprise after several explosions aboard the aircraft carrier.

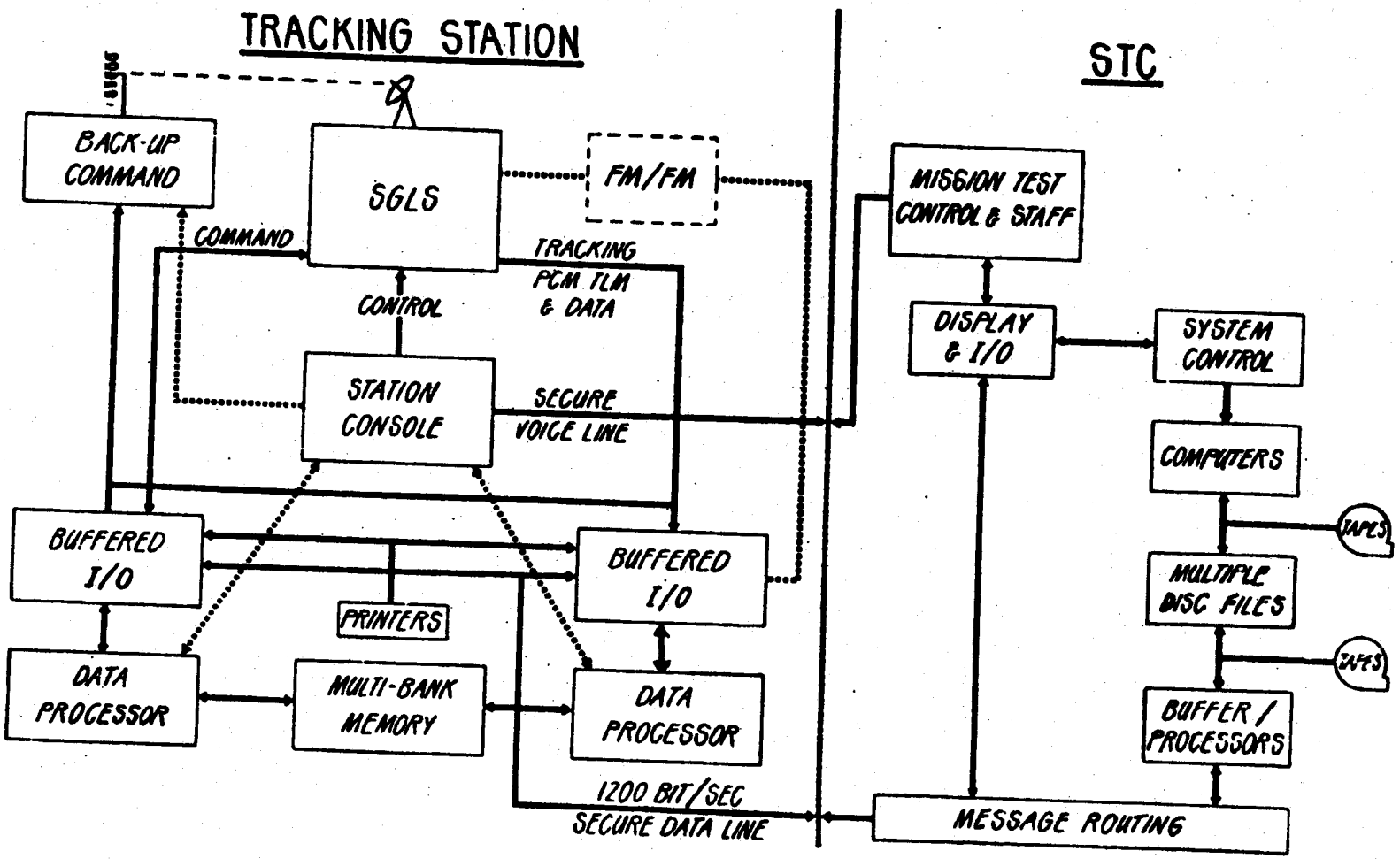
31 January — Installation of advanced SGLS wideband receivers was completed at the NHS and GTS on 2 February and at VTS on 11 March.

9 February — TACSAT I (Hughes Aircraft) was launched into a 19,300 nautical mile near-synchronous orbit from Cape Canaveral. At 1,600 pounds and measuring 9-feet by 25-feet, this was the largest comsat yet launched and orbited by the U.S. TACSAT I was used to determine the feasibility of communications repeators with small mobile ground tactical communications equipment, as well as the possibility of conducting satellite communications over great distances. Design life was estimated at five years.

3 March — A $74 million contract was awarded to TRW Systems Group by SAMSO for development and production of six flight models of an advanced comsat for the DSCS II effort using steerable, narrow-beam antennas to increase performance.

18 March — The Hawaii Tracking Station at Kaena Point became the first SCF network remote tracking facility to support real-time operations using the Advanced Data System (ADS).

SYSTEM DESIGN 1967-70



25 March	The Guam Tracking Station (GTS) entered the SCF's operational inventory with no flight limiting discrepancies. The mobile tracking station, configured in numerous vans since September 1965, supported its last pass on 15 February.
31 March	The cost of living in the Sunnyvale area continued its rise with NCO's spending from $60 to $70 and officers from $70 to $100 over their BAQ for living accommodations. Some substandard housing was available at Parks AFB, Pleasanton, through the Alameda Naval Air Station.
25 April	Installation of the Advanced Data System at Vandenberg Tracking Station was completed.
May	General Dynamics/Convair, Lockheed, North American Rockwell, and McDonnell-Douglas were selected by the Space and Missile Systems Organization to prepare design concepts for a reusable space vehicle for the Space Transportation System.
15 May	Permanent structures at GTS were completed consisting of a new technical building with living accommodations for 75 persons; a power generating station; and a new 60-foot Telemetry, Tracking, and Commanding (TT&C) antenna.
22 May	Advanced Data System (ADS) and SGLS equipment and other modifications were completed at the Guam Tracking Station.
23 May	Two more Vela spacecraft were launched into orbit also representing the conclusion of the Titan III's research and development program initiated in 1962.
29 May	Thule Tracking Station SGLS/ADS equipment installation was completed.
6 June	New Hampshire Tracking Station ADS equipment completed installation.
10 June	Deputy Secretary of Defense Packard announced the cancellation of the MOL program due to a continuing need to reduce Federal defense spending and advances in automated techniques for unmanned satellite systems. The $5.6 million Advanced STC which had been groomed for MOL support and all contractural obligations were either cancelled or underwent extensive analysis after this announcement. The DOD had spent $1.3 billion on the program to date. Cancellation was a "major step" toward reducing the military budget.

16 June	Space Transportation System contractors selected by SAMSO in May were awarded contracts for the study of STS design concepts and technical objectives.
29 June	The first primate mission Biosatellite was launched; other 21-day and 30-day missions were cancelled due to a lack of NASA funds.
16-20 July	Apollo 11, first lunar landing mission was launched. On 20 July, two astronauts set down on the Sea of Tranquility. Astronaut Neil Armstrong becomes the first of 12 men to eventually walk on the moon.
26 July	Advanced Data System installation was completed at the Kodiak Tracking Station with Univac 1230 mTc's replacing the CDC 160-A computer complexes at the remote tracking stations.
29 July	Brigadier General Lewis S. Norman, Jr., replaced Brig Gen Jessup D. Lowe as AFSCF Commander.
October	Both NASA and the Air Force agreed on development of a reusable space vehicle to meet military and civilian space requirements. NASA proposed a two-stage shuttle with a cargo area 60 feet long and 15 feet in diameter.
2 October	Installation of the ADS at the Hawaii Tracking Station was completed.
13 October	The Guam Mobile Tracking Station was officially deactivated.
3 November	Mahe Island, Seychelles, issued the first set of new postage stamps of which the ten-cent variety featured a representation of the U.S. Air Force/ AFSCF remote tracking station.
21 November	Skynet 1A, first of two Skynet military comsats for the U.K., was launched with a design life of three years. The satellite was turned over for operations to the U.K. on 30 January 1970. It weighed 535 pounds at liftoff and measured 54" x 61.8" overall. Skynet satellites could be used in conjunction with the IDCSP satellites of the U.S.

28 November — Headquarters AFSC submitted SAMSO's plan for a precise navigation satellite system to Hq USAF. This later became the Defense Navigation Satellite System.

3 December — Beneficial occupancy of Building 1003 (formerly called the "Advanced STC") was achieved with construction 99 percent complete.

1970

28 January — An agreement was concluded for the AFSCF to operate the Camp Parks Radiometric Test Facility with approval from SAMSO's Deputy for Space Communications Systems.

17 February — The Air Force and NASA signed an agreement to insure that the STS would provide maximum utility to both military and civilian users at lower O&M costs than the existing (missile) space launch systems. NASA would manage STS development and a NASA-USAF committee would review the overall program to guarantee that it did indeed meet DOD as well as NASA requirements.

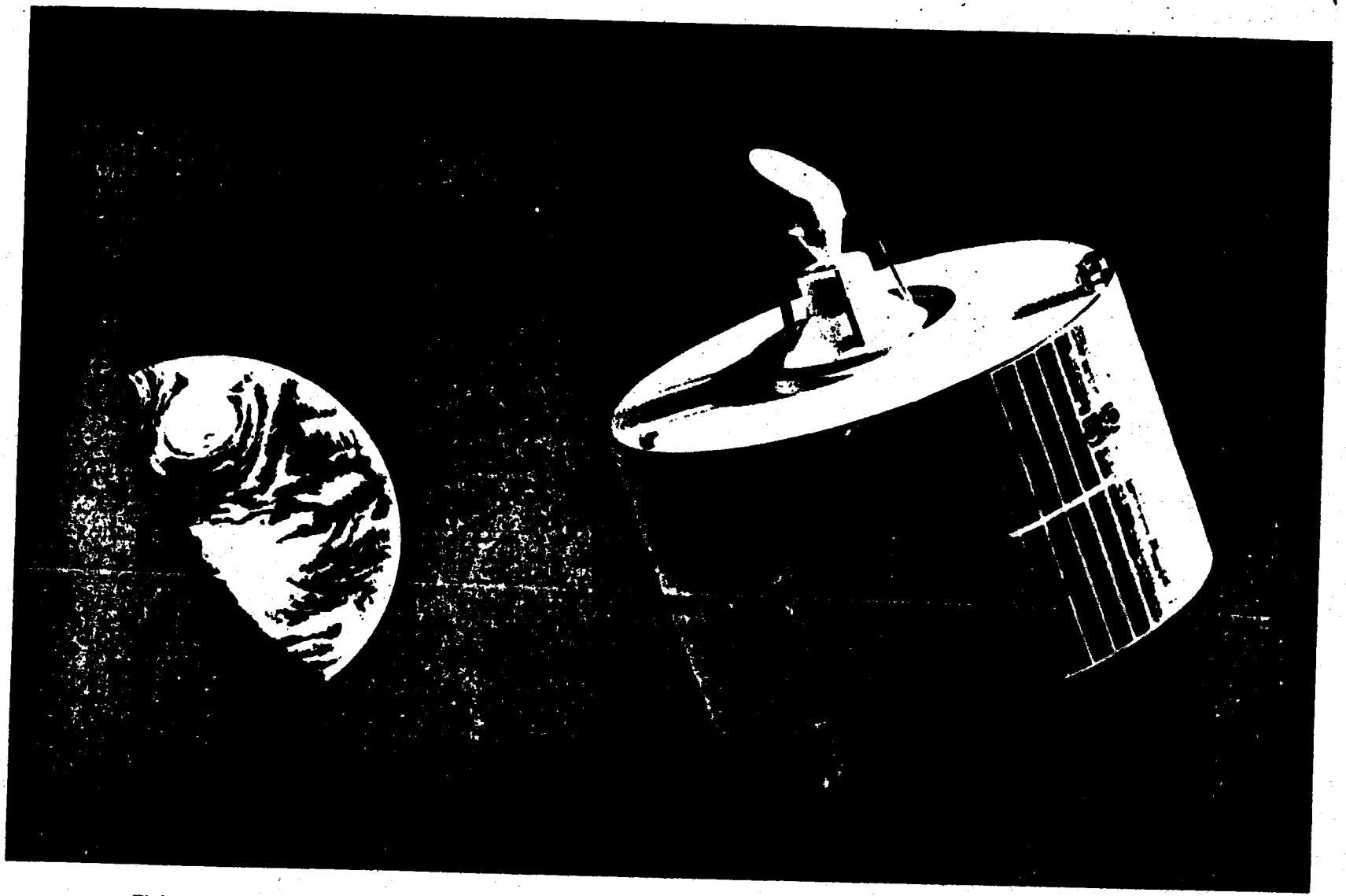
March — The SCF conducted rehearsals for the first NATO Communications Satellite launched on 20 March and turned over to Supreme Headquarters Allied Forces Europe (SHAFE) on 19 May. Contracted to Philco-Ford, the spacecraft weighed 535 pounds at liftoff; measured 54" x 61.8" and had a design life of three years (essentially a Skynet vehicle).

1 April — Hq Air Force Western Test Range (AFTWR) was inactivated with the Hq Space and Missile Test Center (SAMTEC) activated at Vandenberg AFB and assigned to SAMSO. Other actions brought all AFSC range and launch operations at Vandenberg under a single command for the very first time.

11 April — The SCF supported the ill-fated Apollo 13 mission. On its way to the moon, Apollo 13's command craft became very cold after the explosion of an oxygen tank. The mission was then aborted and the astronauts returned safely.

22 April — Support by the SCF to the Biosatellite program was officially terminated.

19 May — The AFSCF performed final acceptance of Bldg 1003, the power plant, and power plant gas turbine generators from the U.S. Navy.



This artist's conception depicts international satellites including NATO II and the Skynet vehicles supported by the AFSCF and managed by the Space Division, formerly Space and Missile Systems Organization.

29 June — At the STA, the Collins Radio Company installed EXCELS equipment and an associated test bed for testing.

1 July — Interim operating capability was established for TACSAT consisting of TACSAT I and LES-6. Testing had been so successful that tri-service traffic was added for relay through the system.

The AFSCF assumed nominal responsibility for the Camp Parks facility at Pleasanton, California. Radiometric tests were used for analysis of communications satellites. The primary user was an element of SAMSO. Camp Parks had been operated by MIT Lincoln Laboratory.

Univac 1230 mTc systems were purchased for the remote tracking stations in the AFSCF network for $13.8 million.

5 August — Installation and checkout of the ADS/SGLS was completed at Mahe Island in the Seychelles, Indian Ocean.

19 August — Skynet B (second in the series) was launched from Cape Canaveral. Contact was subsequently lost during the firing of its apogee kick motor on 22 August and was not regained.

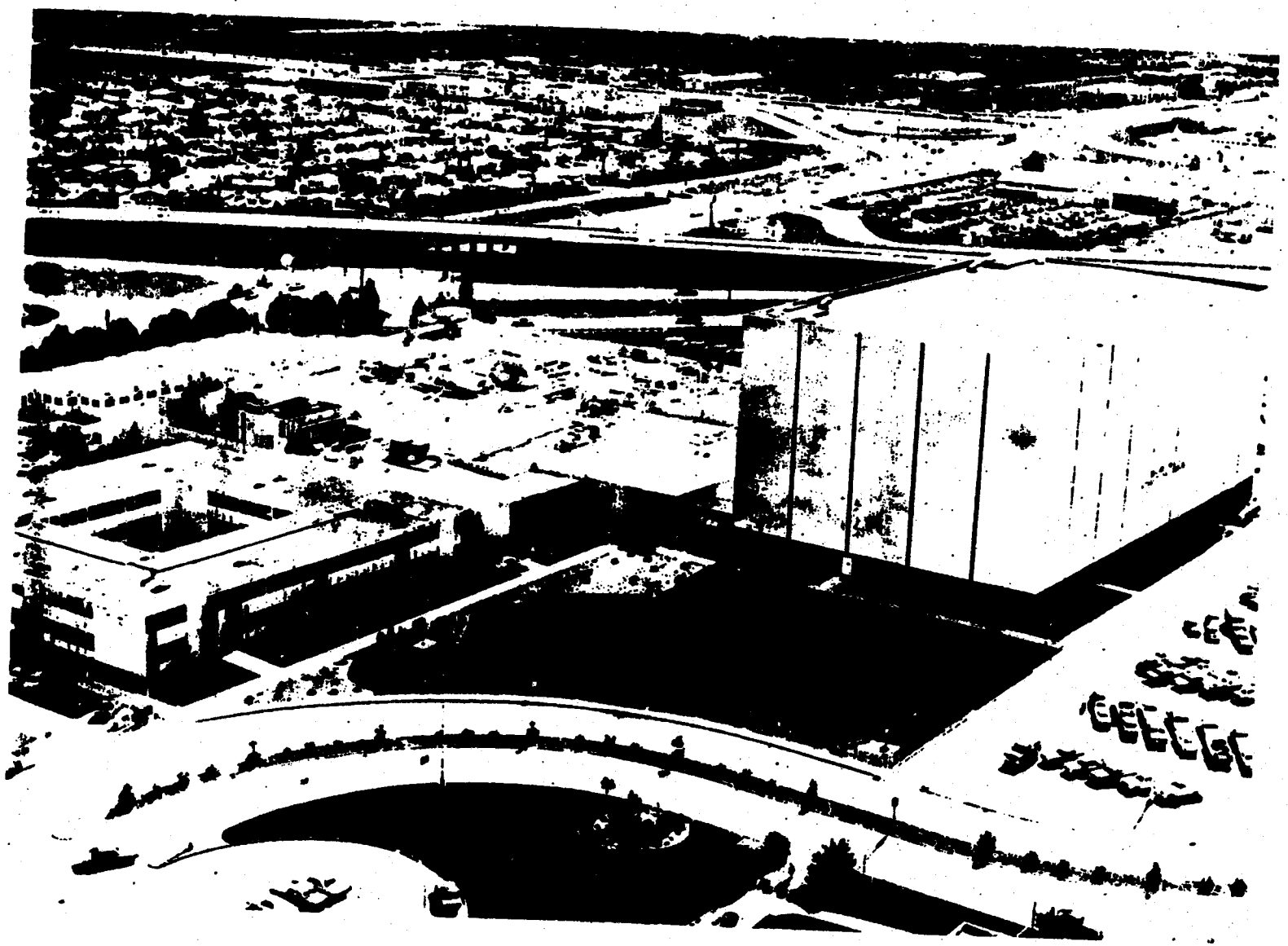
November — The last of three new operational MCC's in Bldg 1003 was completed and accepted. Provision of these MCC's was part of the "STC Move" plan which also included a reallocation of space in Bldg 1001 (original STC).

6 November — The AFSCF conducted its first meeting of the Space Transportation System (STS) Working Group.

24 November — Headquarters AFSC announced that SAMSO proposed development of a navigation system employing several clusters of satellites and ground stations. When developed, the system would provide three-dimensional position and velocity information to users worldwide.

1971

1 January — The Satellite Test Annex (STA) was redesignated as Sunnyvale Air Force Station (SAFS). This was the first official termination of the STA designation although "STC" was commonly used for years. The acronym STC continued as the distinction between the operational nerve center of the AFSCF network and the facility as a whole at Sunnyvale.



1971 Aerial View of the Air Force Satellite Control Facility

31 January	Apollo 14 was launched on the third successful U.S. lunar landing mission.
1 February	Development plans were announced for the Wideband Communications System using a satellite relay between the STC and all remote tracking stations. The system would eventually handle up to 1.5 megabits of data from those stations to the STC. A prototype system using DCA satcom terminals in Hawaii and Guam would be used to communicate with the 60-foot dish at Camp Parks.
2 February	The second NATO comsat was launched and positioned in a synchronous orbit two days later.
15-20 May	A development concept paper from SAMSO for the military comsat system was halted at Hq USAF after an agreement was reached with the U.S. Navy that its proposed FLTSATCOM system would be developed with channels set aside for Air Force use.
June	A 400-foot boresight tower was installed and became operational at the New Hampshire Station replacing an older system located on South Mountain.
1 June	Colonel John J. Schmitt, Jr., replaced Brig Gen Lewis S. Norman, Jr., as AFSCF Commander.
2 June	All communications circuits were relocated from Bldg 1001 to Bldg 1003 thus permitting additional operator space, improved facilities, better working conditions, and the correction of some security difficulties.
30 June	The AFSCF received its second Air Force Outstanding Unit Award for the period 1 January 1969 through 31 December 1970.
1 July	Representatives from the Software Development Facility conducted a system demonstration of the "paperless" printer which displayed the output of data lines on a digital television instead of a conventional line printer.
26 July	Apollo 15 was launched with the first lunar-roving vehicle.
16 September	The Vela Data Transmission Systems (VEDATS) became operational for sending real-time and playback Vela data from the tracking stations through an STC bird buffer into the VEDATS computer which sent it to either one or both of the user agencies -- the Air Force Technical Applications Center (AFTAC) or Air Force Global Weather Central (AFGWC).

27 September — Acquisition of the Navy Fleet Satellite Communications (FLTSATCOM) system was approved for the Air Force by Deputy Defense Secretary Packard. The spaceborne segment of the global (less polar) UHF comm system would be developed by SAMSO. Also approved was acquisition of UHF airborne and ground terminals for Air Force use with FLTSATCOM and other selected satellite systems. When finished, the latter program, AFSATCOM, would provide the AF with a communications system for high priority requirements.

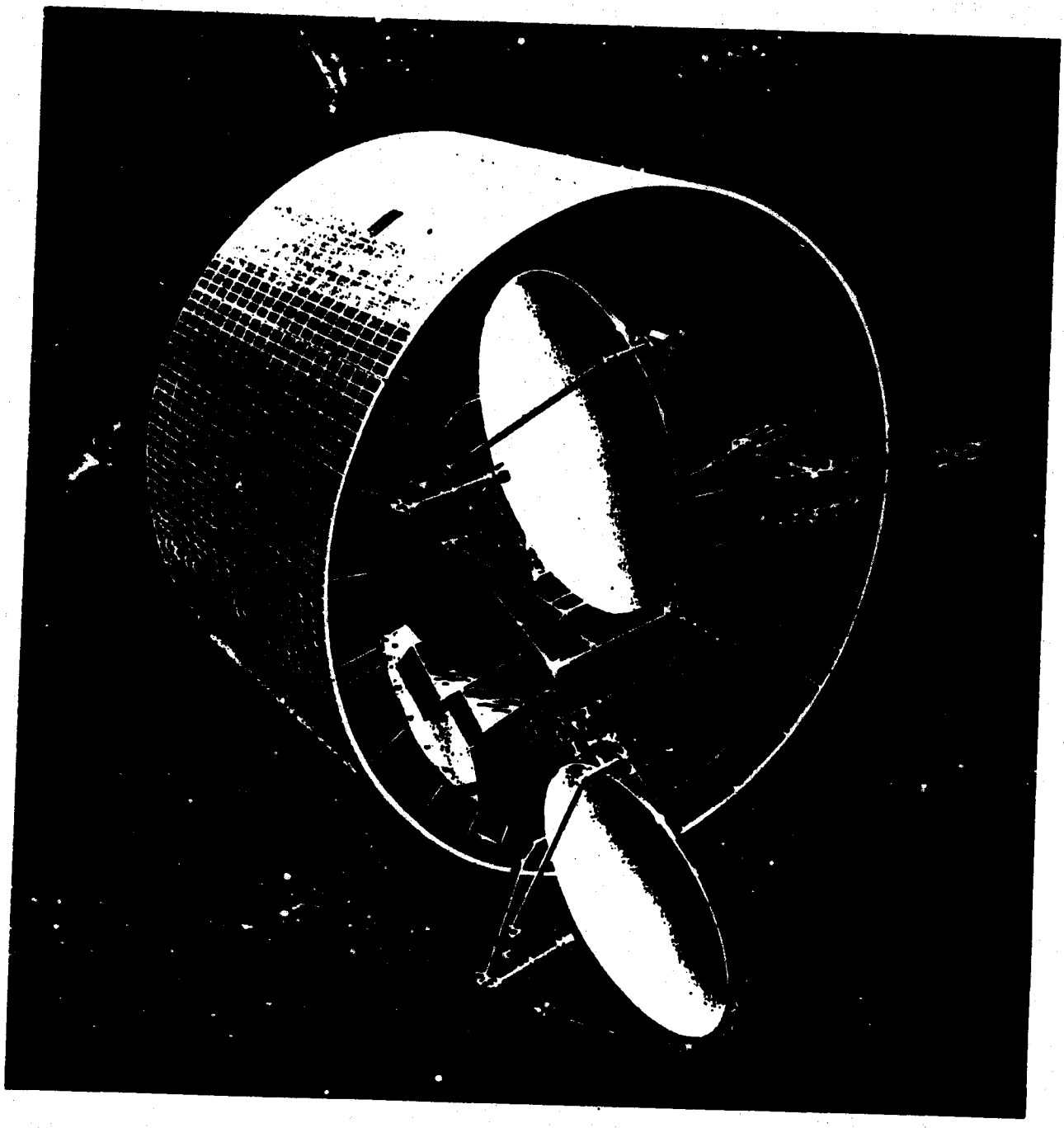
8 October — The Consolidated Open Mess facility at Sunnyvale AFS was accepted by the Air Force after three months of of construction work. The 4,000 square foot facility had been prefabricated and included two rest rooms. Floor covering, painting, and interior furnishings were not included.

2 November — The first pair of Defense Satellite Communications System (DSCS II) advanced comm satellites were launched into orbit. Telemetry and command links could not be established until 5 November. The satellites weighed 150 pounds and measured 9' by 13' with capabilities to handle voice, teletype, computerized digital data, and video transmissions. The DSCS satellites (TRW Systems Group), were intended as replacements for the IDCSP system vehicles and had a design life of five years.

1 December — The 46-foot antenna system at the New Hampshire Station entered the AFSCF's inventory.

1972

January — All remote tracking stations except the Indian Ocean Station and Vandenberg, along with the SCF, changed clocks/timing from the former Universal Time Coordinated (UTC) rate with an offset for astronomical time. A new UTC rate based on the International Atomic Time Scale without offset for true astronomical time was adopted. Leap seconds were introduced every six months beginning 1 January to compensate for the drift rate away from true astronomical time without impact to any satellite operations.



Artist's representation of a typical Defense Satellite Communications System, Phase II (DSCS II) vehicle.

January	Subsequent to the previous November launch of two DSCS II satellites which had no command capability for three days, the SCF initiated plans to establish a Remote Vehicle Checkout Facility (RVCF) at Cape Kennedy, Eastern Test Range, to allow verification of command and telemetry compatibility prior to launches from that area. The New Hampshire Station was selected as the interfacing SCF remote tracking station. The RVCF would include both SGLS and non-SGLS capabilities for vehicle checkout.
5 January	President Richard M. Nixon announced that NASA would manage a $5.5 billion program to develop a space shuttle as the workhorse of future U.S. space efforts and as a replacement for all existing launch vehicles except the smallest and largest.
14 February	After eight years of work to obtain a raise in the basic allowance for subsistence (BAS) at Sunnyvale AFS, an increase for enlisted personnel was granted. The BAS rose from $1.46 per day to $2.57 per day.
29 February	Headquarters USAF announced the closure of Grenier AFS, New Hampshire by September 1972. As a result, the 6594th Instrumentation Squadron relocated to New Hampshire Tracking Station, New Boston, New Hampshire.
14 April	Kennedy Space Center (KSC) and Vandenberg AFB were announced by NASA as the operational bases for the Space Transportation System. Research and Development and civilian shuttle launches would be made from the Cape. Military launches would occur from Vandenberg. On 2 May, industry was asked by SAMSO to submit proposals for development of the shuttle.
16 April	Apollo 16, the fifth lunar mission, successfully landed on the moon.
26 May	Wernher von Braun, developer of the German V-2 and director of the development of U.S. Saturn rockets which overcame the Soviet's early lead in space and put Americans on the moon, retired from NASA.
June	A contract was awarded to Lockheed for digital television built by Ford Aerospace to be installed in the STC for computer-controlled switching with 20 video channels from Bldg 1003 to Bldg 1001; partial implementation of a keyboard/light pen entry system; and direct conversion of bird buffer printer data into video signals sent to switching systems for distribution to operational areas.

30 June — Baselines for STS support by the AFSCF were announced including flight planning and resource scheduling; on-pad shuttle and payload checkout; TT&C for the shuttle at altitudes above 400 nautical miles and during contingency operations; an interface with the shuttle crew during satellite retrieval and deployment; and the ability to support STS launches with as little as two hours advance notice.

1 July — Command of Kodiak Naval Station, Alaska, transferred from the U.S. Navy to U.S. Coast Guard. This action resulted in the loss of aircraft shuttle services from the Kodiak Tracking Station to Elmendorf AFB, along with site security protection, office machine repair services, and television reception.

A consolidation of the Edwards AFB, AFSCF operating location and the 6594th Test Group at Hickam AFB, Hawaii, resulted in savings estimated at $400,000, one C-130B aircraft, and five manning authorizations.

At the same time, the 6593rd Test Squadron (Special) was inactivated with its personnel and mission becoming the Operations Division of the 6594th Test Group at Hickam AFB. Also effective 1 July, the 6593rd Instrumentation Squadron was reassigned from the 6594th Test Group to Headquarters AFSCF.

17 July — Operating Location #9, Indian Ocean Station, Mahe Island, Seychelles, was redesignated as Detachment 4, AFSCF.

26 July — A $2.6 billion contract was awarded from NASA to the North American Rockwell firm for development of the national STS and Space Shuttle including the first flight scheduled in 1976 and the first orbital mission expected in 1979.

5 August — A data tape was successfully played through the Interim Wideband Comm System from the Hawaii Tracking Station to Camp Roberts for subsequent delivery to the user.

28 August — The Remote Vehicle Checkout Facility (RVCF), Cape Canaveral, was declared operational.

September — The seventh CDC 3800 computer was added to the STC in Bldg 1003, SAFS.

9 November	ANIK-I, a Canadian satellite (Telstar-A comsat), was placed into orbit.
17 November	The first spacecraft telemetry was recorded on analog tape at the RVCF and sent to New Hampshire Tracking Station for processing with excellent results.
4 December	The Wideband Data System per se was cancelled when procurement of the system was directed to the Defense Communications Agency (DCA) by higher headquarters. Overall objectives remained the same, and similar plans for a communications upgrade were continued at the AFSCF.
7 December	The final U.S. moon mission, Apollo 17, was launched.

1973

January-June	Plans for a backup STC facility at the Computer Program Development Center, Santa Monica, California, were approved by SAMSO as an expansion of "Alternate STC" capabilities implemented in September 1965. Minimum modifications were required to provide a capability to carry on limited operations for two to three space programs. Only the New Hampshire and Vandenberg Tracking Stations were linked to the "BUSTC" with each having two data/voice lines.
10 January	Collins Radio and RCA were awarded contracts for development of the Air Force Satellite Communications (AFSATCOM) system.
15 January	The 6594th Support Group at SAFS was redesignated as the 6594th Air Base Squadron by Hq AFSC.
23 February	A "Conceptual Approaches to Upgrading the Real-time Data System Study" was published updating the previous Wideband Data System plan. Included in the new plan were provisions for replacing CDC 160-A bird buffer computers and peripherals for the existing control and display system; identification of a requirement for an off-line telemetry processing system (TOPS) at the STC; and numerous additional facility improvements.
5 March	The Air Force announced that a $27.6 million contract had been awarded to Philco-Ford for development of a NATO III satcom system with SAMSO providing DOD program management.

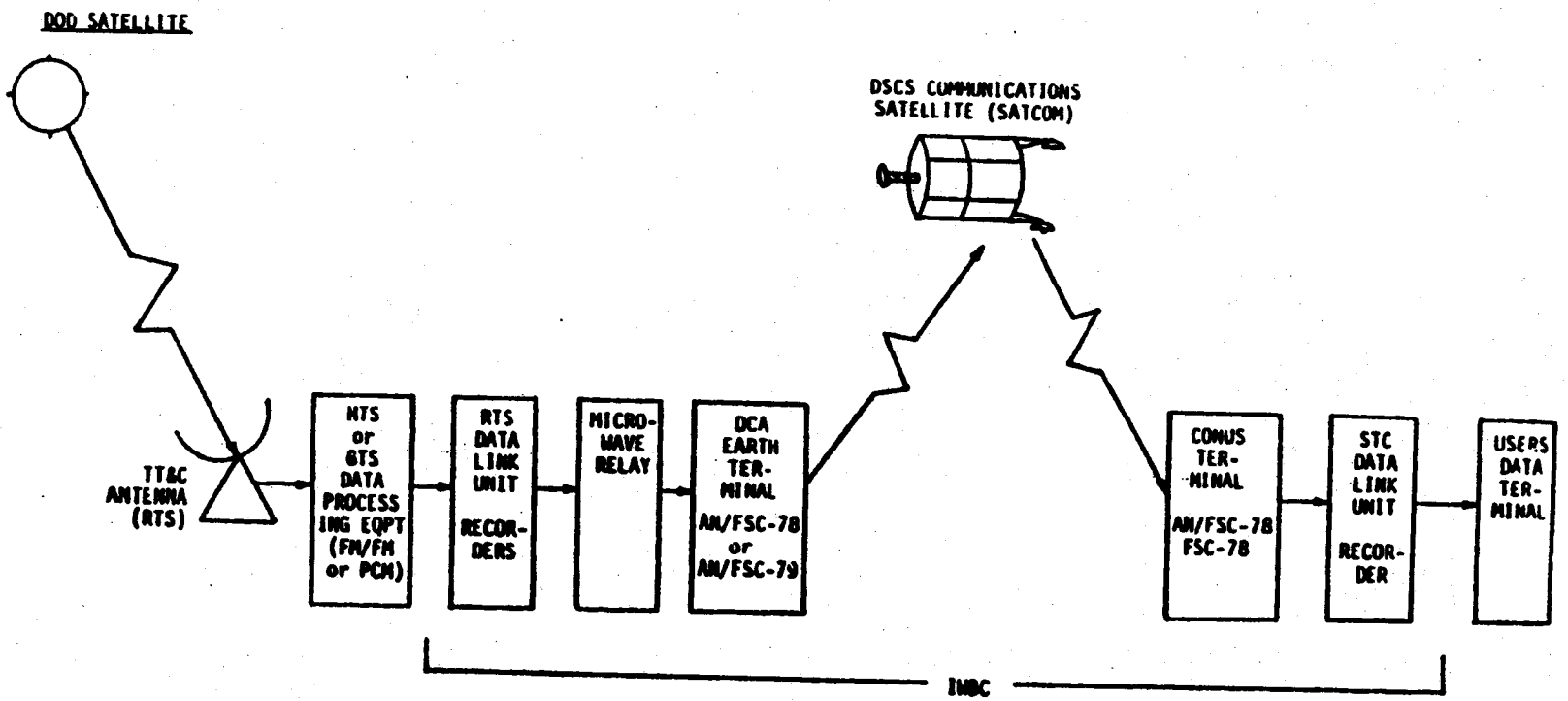
14 May	Skylab, the first American orbiting laboratory, was successfully launched. This event brought back memories of the Manned Orbiting Laboratory (MOL) program that was cancelled in mid-1969.
	An Air Force Program Memorandum on DOD Space Shuttle Utilization was completed which assumed that the DOD would develop the shuttle's Inertial Upper Stage (IUS) required for high energy missions until NASA's introduction of a "Space Tug" at a later date.
6 June	In order to comply with a limitation on official telephones in various categories at Sunnyvale AFS, 378 lines were converted resulting in a total of 40 percent Class A and 60 percent Class C services.
29 June	A Presidential Memorandum imposed a seven percent energy reduction in fuel oil consumption during FY 74 and Sunnyvale AFS appointed its first Energy Conservation Officer.
1 July	Deactivation of the AFSCF's Operating Location #1 at Edwards AFB, California, and its consolidation with the 6594th Test Group at Hickam AFB became effective officially. Plans had been approved one year ago.
15 July	The servicing Consolidated Base Personnel Office (CBPO) for Sunnyvale AFS switched from Los Angeles AFS to Travis AFB, California.
1 September	Precision Equipment Measurement Laboratory (PMEL) support for the STC was changed from Hamilton AFB to Travis AFB.
13 September	The first Installation Chaplain, Major (Chaplain) Robert S. Egigian, was assigned to Sunnyvale AFS.
30 September	The Advanced Control Experiment 1 (ACE 1) vehicle was launched from Vandenberg AFB to test development of a pre-prototype maneuvering reentry vehicle as part of the ABRES program.
October	The Sunnyvale AFS Field Training Detachment (FTD) was deactivated.
1 October	Contingency use of the Santa Monica BUSTC facility was authorized following completion of communications and computer equipment testing during the previous month.

11 October	The AFSCF received its third Air Force Outstanding Unit Award. The award covered the period from 1 July 1971 to 30 June 1972.
December	Headquarters AFSC announced that both recovery ships, (USNS Longview and USNS Sunnyvale), would be phased out and replaced with HH-53 helicopters.
13 December	Two more DSCS II satellites were launched into synchronous equatorial orbit.
21 December	Sunnyvale AFS was approved for siting a DCA Pacific Control Station (AN/MSC-60) by Hq USAF. The site would be one of four similar installations procured by the U.S. Army Satellite Communications Agency.
22 December	Deputy Secretary of Defense Clements authorized the start of Phase I of the Global Positioning System (GPS) development program.

1974

18 January	Skynet IIA, contracted to Marconi Space and Defense Systems, Inc., was launched from the Eastern Test Range. Unfortunately the payload was lost due to a malfunction of the Thor Delta launch vehicle. The satellite weighed 960 pounds at liftoff and measured 75" x 82.3".
9 February	The Interim Wideband Communications System (IWBC) became operational from Hawaii to Guam to the STC using a DSCS II satellite.
13 April	Westar-A was launched becoming the first NASA U.S. commercial domestic satellite.
30 May	Applications Technology Satellite (ATS-F) was launched and used by the Indian Government to beam educational television programs to its people in order to reduce illiteracy. This was the first satellite ever built in order to transmit signals directly to individual television sets.
20 June	Fabrication of three Navigation Department Satellites for the Global Positioning System program was awarded by contract to Rockwell International at $42.9 million.

INTERIM WIDEBAND COMM (IWBC) BLOCK DIAGRAM



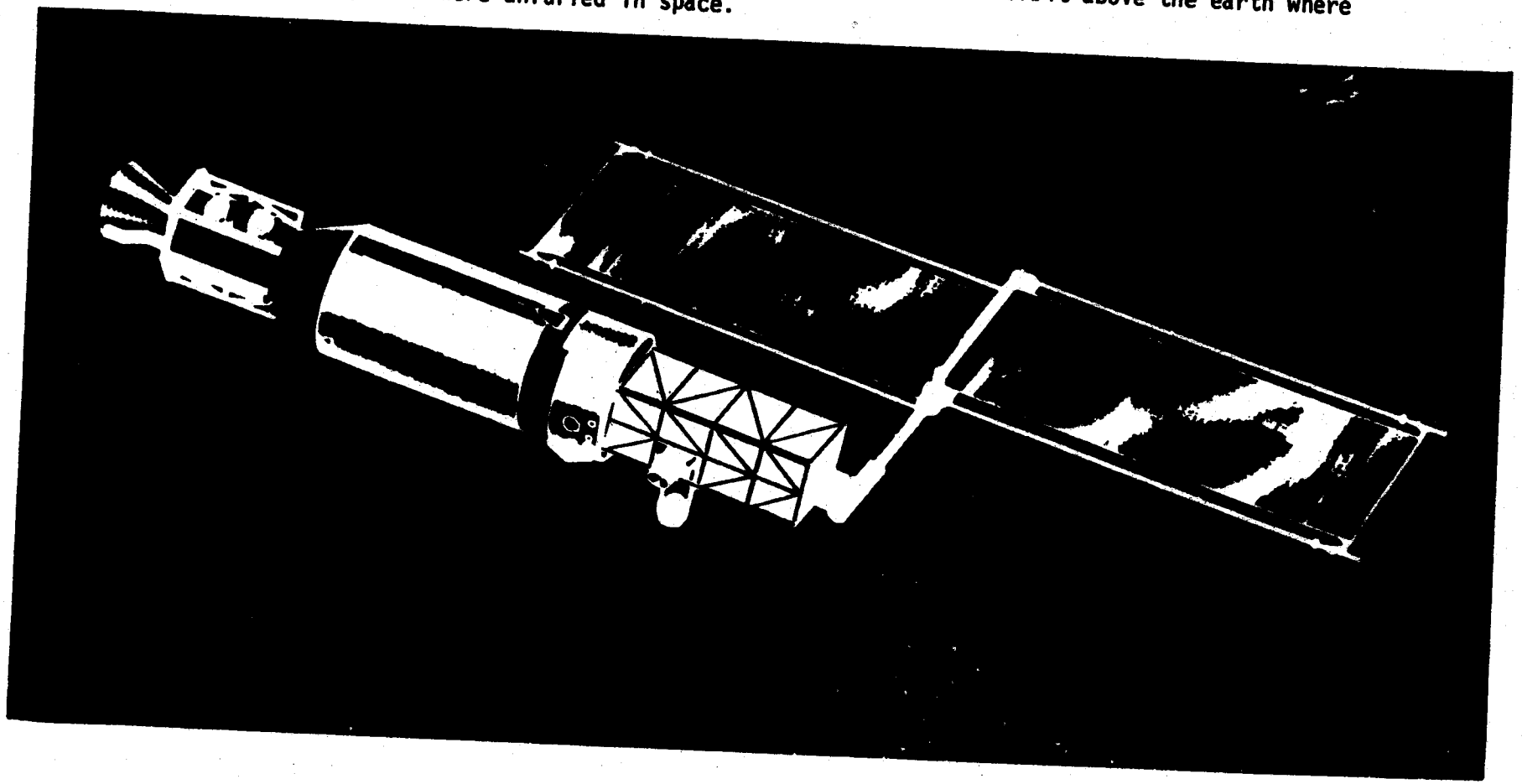
13 July	Space Test Program (STP) Flight P73-3 was launched with a Navy Navigation Technology Satellite (NTS-1) payload successfully placed in orbit.
19 July	The first known aerial recovery of a payload launched by a sounding rocket was performed at the White Sands Missile Range.
31 July	Colonel Robert A. Van Arsdall assumed command of the AFSCF replacing Col John J. Schmitt, Jr.
13, 14 August	The backup STC (BUSTC) at Santa Monica, California, was successfully tested.
2 October	The USNS Longview along with two borrowed SH-3A Navy helicopters were released from surface recovery duty with the 6594th Test Group.
3 November	A satellite link was activated between Thule Tracking Station and Point Reyes, California, permitting the deactivation of the Thule submarine cable facility by February 1975.
15 November	At Sunnyvale AFS, the Class A telephone services were upgraded to access Autovon circuits with a direct dialing capability.
22 November	Skynet IIB was launched into an elliptical transfer orbit. Two days later the apogee kick motor boosted the vehicle into a near circular orbit and final position in synchronous orbit over the Indian Ocean.
2 December	The USNS Sunnyvale together with five CH-3B helicopters were released from surface recovery duty with the 6594th Test Group.
7 December	The first recovery (aerial) of a sounding rocket payload over a broad ocean area was performed for a HAVE JEEP II program payload.
31 December	Operating Location AI was designated and organized at Sunnyvale AFS reporting to Hq SAMSO in Los Angeles.

1975

23 January	Headquarters USAF issued a Program Management Directive (PMD) specifying that initial DOD shuttle mission operations would be planned and controlled by a predominantly NASA team rather than DOD team. In addition, NASA facilities would be used. The directive also required that action be taken to minimize the impact of DOD communications security requirements for shuttle operations.

Typical Experiment - Space Test Program

This artist's conception of a typical experiment for the DOD's Space Test Program (STP) depicts a Flexible Rolled-Up Solar Array, launched in late 1971. The panels contained more than 34,000 solar cells used to convert the energy of the sun into 1,500 watts of power. This particular vehicle was launched into a 400-mile orbit above the earth where the solar panels were unfurled in space.



31 January	In the first demonstration of the combined development, test, and evaluation of the AFSATCOM program, message traffic was sent from an airborne AFSATCOM terminal over Ohio to a ground terminal in New York.
	Fairchild Space and Electronics Company was awarded a $4.5 million contract from SAMSO for development of the GPS upper stage.
15 March	Kodiak Tracking Station ceased operations pending deactivation following a lengthy decision process. The station had serviced only low and medium altitude satellites. The closure was estimated to save $5.5 million annually.
May	A contract was awarded for the Data Link Terminal (DLT).
15 June	The last American manned space mission for years to come was conducted with an Apollo program launch carrying one of the original Mercury astronauts, Deke Slayton. This space mission (Apollo-Soyuz) linked up with a Soviet spaceship whereupon the crews shared meals, conducted joint experiments, and held a news conference. Until the space shuttle, this was the last manned U.S. space mission. During the interim, 19 Soviet missions would be recorded including one which stayed in orbit for 185 days.
1 July	Detachment 3, 1901st Communications Squadron (AFSC) was activated at Sunnyvale AFS to operate the DCA Satcom Facility.
	The Space and Missile Systems Organization's responsibility for the Vela program was ended.
15 July	Camp Parks Radiometric Test Facility was redesignated as Camp Parks Communication Annex and AFSCF Operating Location AB was activated to operate the facility.
18 September	A memorandum of agreement between SAMSO and the Electronic Systems Division (ESD) became effective under which the former was given lead division responsibility for AFSATCOM I, II, and III.
30 September	The Kodiak Tracking Station, Alaska, was officially inactivated.
December	Headquarters USAF decided that the DOD would not acquire its own Space Shuttle mission operations system, but would rely on/use NASA's system instead.

The Block 5D satellite, an Integrated Spacecraft System (ISS), was first launched in 1976 to support the Defense Meteorological Satellite Program (DMSP). The 4000th Aerospace Applications Group, Offutt AFB, Nebraska, provided all command and control of the satellites which obtained primary and special data as requested by the primary user, Air Force Global Weather Central.

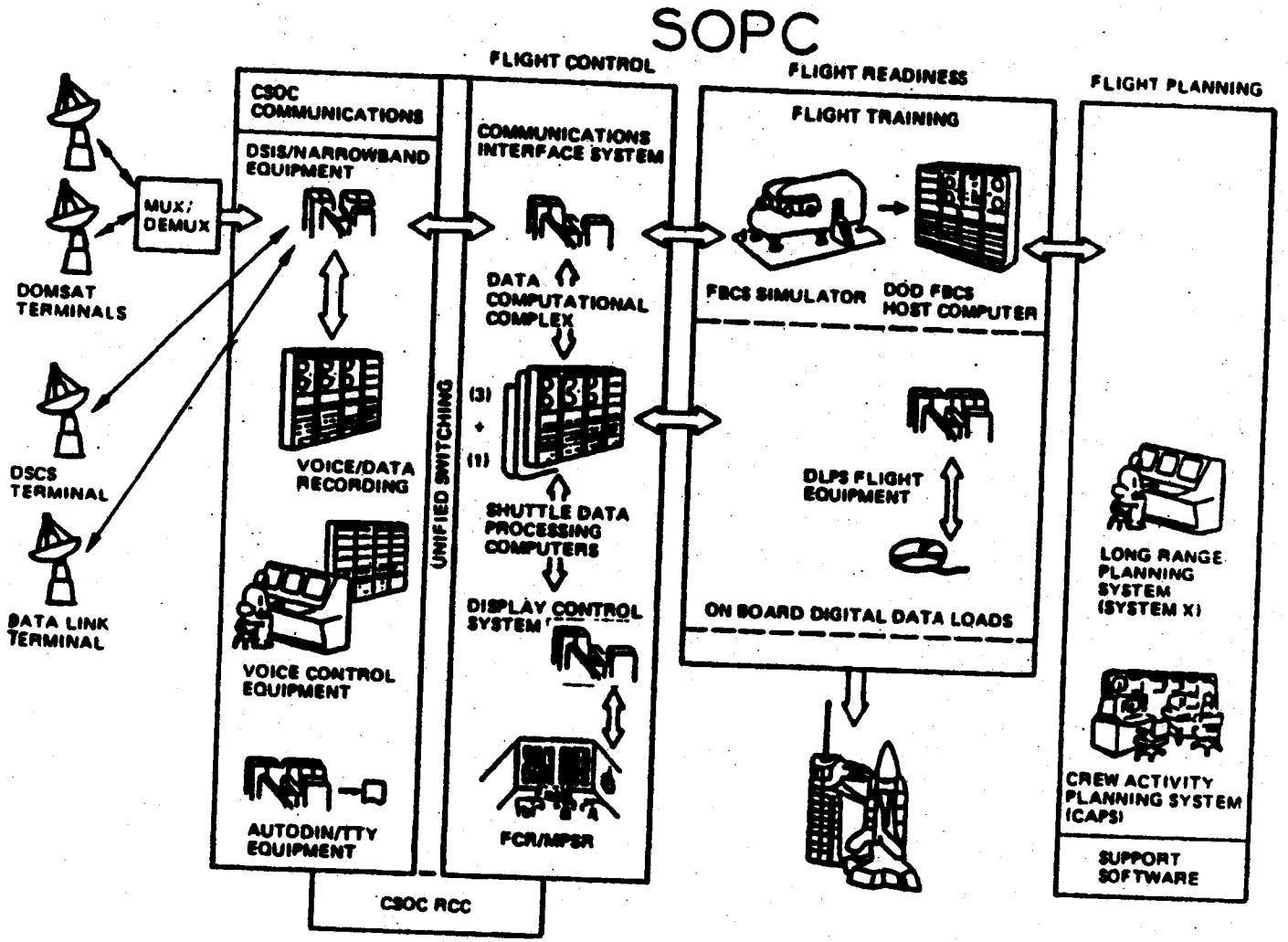
1976

17 February	Satellite support operations by the STC began a transition from CDC 160-A computers to Varian 73 models and remote tape drives. Interim operating capability was achieved in May.
23-26 February	A joint DOD/NASA study carried out on the consolidation of expendable launch vehicles during the transition to the Space Shuttle, recommended that the Inertial Upper Stage (IUS) be used with the Titan III launch system.
14 March	Space Test Program Flight P74-1 was launched with a Lincoln Experimental Satellite pair (LES-8, LES-9), as well as solar radiation satellites 11A and 11B.
22 April	The NATO IIIA satellite was launched. It weighed 1,532 pounds at liftoff and measured 86" x 121.7". The satellite was under contract to Philco-Ford with a design life of seven years. It became operational on 26 July 1976.
21 May	Guam Tracking Station (GTS) was disabled by Typhoon Pamela and would not be able to resume full operations until the following August.
24 May	Headquarters AFSC directed SAMSO to plan for the relocation of Headquarters AFSCF from Los Angeles to Sunnyvale AFS.
29 June	The flag of the new Republic of Seychelles was raised and the British Union Jack was lowered marking the end of 160 years of British rule and the emergence of the islands as an independent sovereign state. Leaders of the two major island political parties were appointed to Government of Seychelles posts. James R. Mancham became President of the new republic, and France Albert Rene was the new nation's Prime Minister.
1 July	Colonel Ralph H. Jacobson assumed command of the AFSCF replacing Col Robert A. Van Arsdall.
1 August	Modifications at RAF Oakhanger, a British tracking station, were initiated to provide more support for an anomalous Atlantic DSCS II satellite.

11 September	The first Defense Meteorological Satellite Program (DMSP) Block 5D satellite was launched. The vehicle was built by the RCA Astro Electronics Division and weighed a whopping 5,272 pounds at liftoff. When deployed in space, the spacecraft measured 16' x 10' and had a design life of 2.5 years.
17 September	Roll-out of the first space shuttle vehicle occurred.
21 October	The STC-to-Thule data link became operational.
22 October	Headquarters USAF approved the conversion of the Vandenberg Tracking Station as the only blue-suit station in the AFSCF network to a contractor-manned facility.
11 November	The AFSCF received its fourth Air Force Outstanding Unit Award. It covered the period 1 July 1974 through 30 June 1976.
7-9 December	In a briefing presented to Hq AFSC, Hq USAF, and the Secretary of the Air Force, three alternative methods for providing the DOD with a missions operations system for the Space Shuttle were outlined. Those methods included: (1) Modifying NASA Johnson Space Center facilities; (2) Expanding the AFSCF; and, (3) Constructing an all-new DOD facility to be dubbed the STS Operations and Planning Center (SOPC).

1977

14 January	The Vela program control center was relocated from MCC-M to MCC-B. Its former space was occupied by elements supporting the Global Positioning System.
17 January	Deputy Secretary of Defense approved initiation of the General Purpose Satellite Communications System Program and the Strategic Satellite System Program.
27 January	The NATO III-B communications satellite was launched into orbit from Cape Canaveral.
February	A tracking system was installed at Hickam AFB, Hawaii, which allowed Hickam to track DMSP satellites and receive data directly from them. The system was declared operational in June with Hickam operating as a weather readout station in the DMSP system.



PROPOSED SHUTTLE OPERATIONS AND PLANNING CENTER CONFIGURATION

February — Headquarters USAF approved the full-scale development of a single channel transponder (SCT) for the AFSATCOM program to be deployed on DSCS III satellites.

24 March — The first DMSP Block 5D vehicle which had gone into a spin after being launched in September of 1976, was successfully de-spun ending a five month effort during which a three-phased recovery attempt occurred.

6 April — Funds were requested by SAMSO to convert Telemetry and Command Station (TCS) Oakhanger in the United Kingdom for AFSCF operations following negotiations with the British. A total of $1.4 million was approved on 17 May by Headquarters USAF.

May — Representatives from NATO visited the United States to gather information related to a proposed NATO IV satellite communications system.

11 May — The AFSCF sent its proposed plan for supporting Space Shuttle Orbital Flight Tests (OFT) to NASA.

17-21 May — Software modifications were installed in the Block 5D DMSP satellite which permitted its attitude control system to operate without the pitch and yaw gyros. Together with an earlier modification allowing the vehicle to function without its roll gyro, this second action prevented the spacecraft from being lost due to overall gyro deterioration.

4 June — The second Block 5D satellite was launched from Vandenberg AFB. A series of anomalies resulted in the vehicle being placed in a retrograde orbit and spinning condition.

5 June — Less than one year after celebrating its independence from Great Britain, the Republic of Seychelles reported a bloodless coup. Militants presumably trained in Tanzania played an important role in this "coup of the 60 rifles." President Mancham, away in London at the time of the coup, was deposed from office. France Albert Rene was asked to form a new government. He agreed after receiving assurances that the rights and property of existing government officials would be respected, that elections would be held, and that all present international agreements would be honored. Both Rene and Mancham had been the leaders of opposing major political parties in the Seychelles since the mid-60's.

17 June — The AFSCF achieved a "first" when it tracked and recorded telemetry from a spinning reentry vehicle during a Minuteman III missile test flight. This event proved that a post-boost telemetry link could be deleted from the missile at a considerable savings.

23 June — Rockwell International's GPS Navigation Technology Satellite #2, the first designed for GPS operations, received launch and early orbit support from the AFSCF. This vehicle had a design life six years mean duration. It weighed 950 pounds and measured 6' x 6' in its launch configuration.

25 June — The AFSCF completed recovery efforts to restore operating capabilities with the second DMSP Block 5D satellite.

July — A joint DOD/NASA committee was formed to find an economical method of securing NASA's Johnson Space Center for use as mission control when classified DOD missions were flown on the Space Shuttle. The final committee report issued in November 1977 recommended that JSC be secured through what was termed a "controlled mode" of operation.

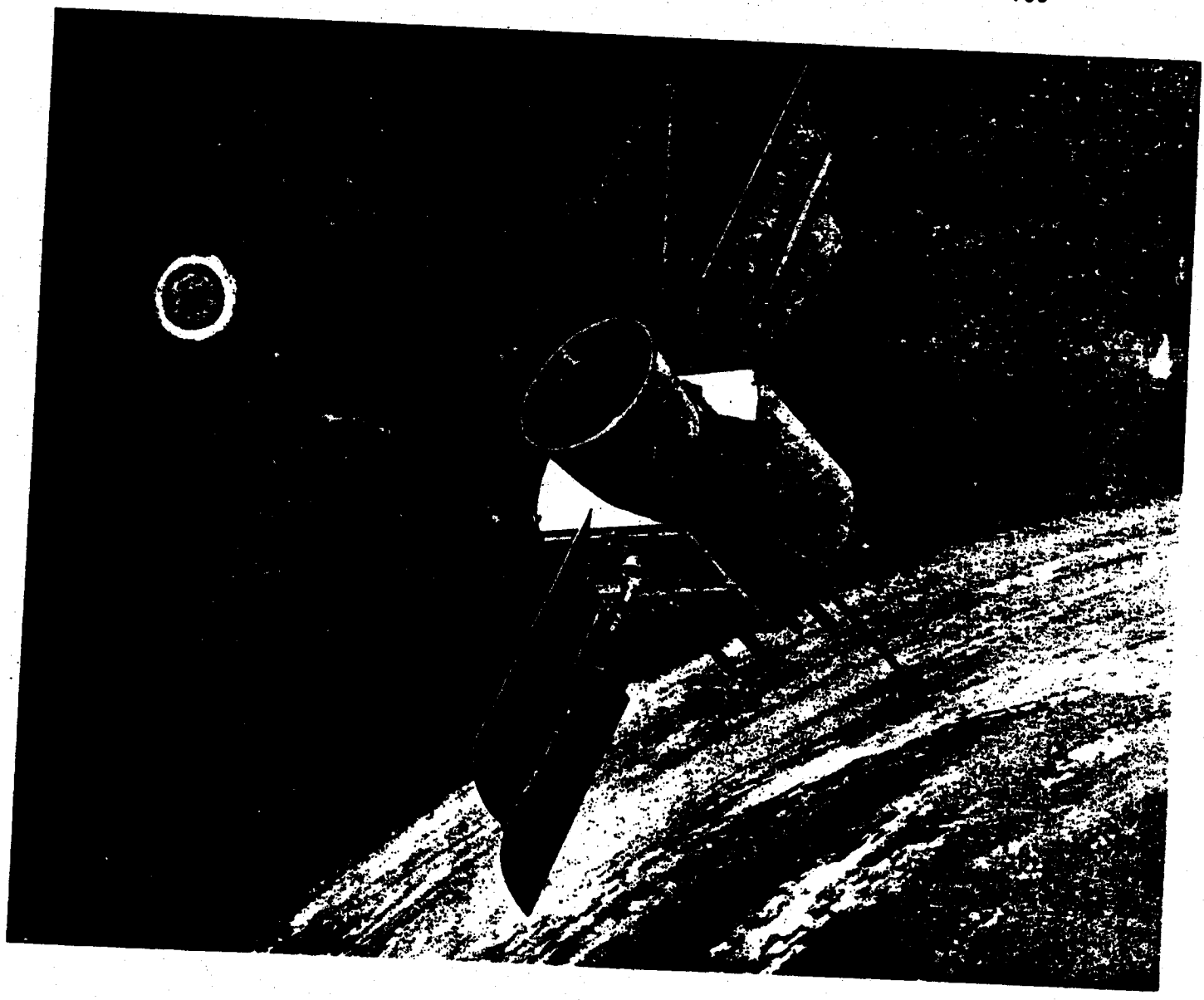
1 July — The headquarters function of the AFSCF was reorganized and physically relocated from Los Angeles to Sunnyvale. Detachment 1 of the AFSCF at Sunnyvale AFS was inactivated.

20 July — A recommendation was made by the AFSCF to construct the proposed Shuttle Operations and Planning Center (SOPC) at Sunnyvale AFS.

12 August — The Space Shuttle orbiter made its first free flight after being carried aloft by a modified Boeing 747 aircraft. The orbiter then landed at Edwards AFB following its release from the host aircraft. Testing in this manner was continued through October.

September — At the STC, the CUBE reached interim operating capability. A 1230 mTc system was acquired for the STC ground station where it was installed with an emulator buffer computer to accept and process PCM data from Vandenberg via microwave, HTS via interim wideband comm circuits, and from NHS via data link circuits. The new station's voice designator was "CUBE," and the Command Data Processing Area was established in two rooms within Bldg 1003.

2-8 September	Vandenberg Tracking Station, HTS, and GTS were modified to relay unprocessed telemetry to the STC or another SCF network station via satellite.
6 September	The Army and Air Force Exchange Service (AAFES) opened a small exchange facility at Sunnyvale AFS following construction which began on 28 March 1977. This was the first exchange facility housed separately from Bldg 1001.
8 September	A new AAFES food service outlet was opened in the SAFS Consolidated Open Mess. Construction had begun on 15 February 1977.
14 September	TCS Oakhanger began supporting a DSCS II satellite thus initiating a three-phased project designed to integrate that station into the SCF global network.
October	Global Positioning System (GPS) monitor stations were developed in Hawaii, Guam, and Alaska, to complete the deployment phase of the Phase I GPS Control Segment.
13-16 October	Both the New Hampshire Station and Indian Ocean Station were modified to relay raw telemetry to the STC or to other SCF network stations.
December	An unofficial study at the SCF was concluded regarding the term "Satellite test Center (STC)," after it was recognized that the term had no official standing and could be confused with the actual designation "AFSCF." The only time when STC was a correct designation was from December 1959 until July 1960 when facilities at Sunnyvale were redesignated as the "Satellite Test Annex." From the earliest period of satellite activities at Sunnyvale, "STC" had been an operational designation used by mission directors. That term gained in popularity and achieved a quasi-official status, appearing in many formal publications. The fact that large, three-foot chrome letters spelled out "U.S. Air Force Satellite Test Center" across the front of the main SAFS entrance from 1969 to 1977, greatly reinforced use of the term. Those letters were removed to reduce visibility of the station. Today, "STC" is a current term used primarily to distinguish between SAFS and the operational control center for the AFSCF. In spite of that clarification, it is not uncommon for those having a long association with the facility to refer to it as the "STC."



Artist's representation of a "Navigation System Based on Time and Ranging (NavStar)" Global Positioning System (GPS) satellite. A series of these vehicles deployed at altitudes over 11,000 nautical miles above the earth would ultimately provide a ten-fold increase in U.S. navigational capability and increase the effectiveness of strategic forces worldwide. Properly equipped users will be able to obtain accurate time, three dimensional position, and velocity information anywhere in the world. The AFSCF currently provides all GPS telemetry, tracking, and commanding.

1978

3 January	Lockheed was awarded a $34 million contract to build a spacecraft for the Satellite Infrared Experiment (SIRE) designed to measure long wave infrared signatures of space objects against a smaller background.
9 February	The first Fleet Satellite Communications (FLTSATCOM) satellite was launched and positioned on-orbit. It became operational on 4 April 1978.
15 February	TCS Oakhanger in the United Kingdom was added to the worldwide AFSCF network as a shared resource and designated as AFSCF Operating Location (OL) AE.
22 February	The first NavStar GPS satellite was successfully launched into orbit with AFSCF support. NavStar 1 was then declared operational on 31 March as the first vehicle in a constellation of satellites planned for the GPS Program.
9 April	A two-month delay in testing the second FLTSATCOM satellite resulted due to damages caused by a fire in the FLTSATCOM assembly area of the TRW Systems Group facility in Redondo Beach, California.
14 April	A contract for full-scale development of the Space Shuttle's Inertial Upper Stage (IUS) was distributed to Boeing Aerospace Company.
15 April	The AFSATCOM space segment was declared operational.
30 April	Special testing was performed by the AFSCF during efforts to keep the third DMSP Block 5D satellite operational in spite of numerous problems which developed shortly after orbit injection and for several months thereafter.
1-12 May	With USAF approval to conduct site surveys for a "Consolidated Space Operations Center (CSOC)," (formerly known as "STC-II"), the AFSCF performed surveys of five potential locations and established mandatory siting criteria.
27 June	The second NavStar/GPS satellite achieved operational status following its 13 May launch.
18 June	Program "S" was established by the AFSCF as the Shuttle Operations Office in preparation for NASA shuttle orbital flight testing and related activities.

6 October — The third NavStar/GPS satellite was successfully launched and positioned in orbit.

29 October — Following equipment modification, installation, and checkout, the first bent-pipe telemetry relay occurred from TCS Oakhanger. The first bent-pipe command relay came shortly thereafter on 4 November.

31 October — Additional site surveys for the CSOC were directed by Headquarters USAF. The surveys were to include four more potential sites.

18 November — The third NATO III spacecraft (NATO III-C) was launched and positioned in orbit.

11 December — The fourth NavStar/GPS satellite was launched.

13 December — Two DSCS II satellites were launched and declared operational in the following month. At that point, the DSCS II system consisted of a full, four-satellite constellation at the disposal of users for the first time in that program's history.

1979

1 January — Vela surveillance satellite support requirements for the DMSP and Air Force Global Weather Central were terminated resulting in a slight decrease in actual AFSCF support requirements for that program.

2 January — Stanford Telecommunications Incorporated was awarded a contract to examine the utility of a "Satellite Control and Data Relay System" using a space-based network to track and control satellites and relay data to ground stations in the continental United States.

3 January — Modifications of the AFSCF's Indian Ocean Station were completed to support Space Shuttle orbital flight testing.

1 February — The DSCS/SCF Interface System (DSIS), a major advance in data transmission capabilities, was declared operational at NHS after necessary modifications, installation, and testing. The DSIS was part of the wideband comm system in early 1975, and it now provides a duplex multichannel digital data link to all SCF tracking stations.

1 March	Colonel Joe E. Sanders assumed command of the AFSCF replacing Colonel Ralph H. Jacobson.
1 April	Vandenberg Tracking Station converted from an Air Force "blue-suit" operation to a contractor operation by Ford Aerospace and Communications Corporation. The action ended an effort under continuous review since 1974.
26 April	The SIRE contract between Lockheed and SAMSO was terminated due to large cost overruns and SAMSO began development of a program to fly the SIRE sensor on a Space Shuttle sortie mission in the mid-1980's.
21 May	Inspector General (IG) team members from Hq AFSC began an inspection of the AFSCF concluded on 15 June.
6 June	The fourth DMSP Block 5D-1 series vehicle was successfully launched.
1 July	At Hq AFSCF, the Advanced Systems Development Program Office (BJ) was formed incorporating some functions previously assigned to the Director of Development and Planning (DV).
4 July	Remarks by Seychelles President Rene during a Fourth of July, American Embassy observance, created concern over the future status of an agreement between the U.S. and Government of Seychelles for operation of the AFSCF's Indian Ocean Station (IOS).
11 July	Skylab plummeted back to Earth six years after reaching orbit. Questions posed as to where the large object might land were answered when Skylab broke into molten debris over the Indian Ocean and Australia.
15 August	Support of the Initial Defense Communications Satellite Program (IDCSP), or first phase of the DSCS program, was concluded by the AFSCF. The IDCSP was originally known as the "Initial Defense Satellite Communication System (IDSCS)."
27 September	General Lew Allen, Jr., Air Force Chief of Staff, approved a proposed construction project to provide 100 family housing units dedicated for Air Force personnel at nearby Moffett Naval Air Station.
1 October	Several organizational changes occurred within the AFSCF, including formation of a Directorate of Logistics. Most remote tracking stations dropped "instrumentation squadron" designations and became numbered AFSCF detachments. In addition, the AFSCF's parent command, Space and Missile Systems Organization (SAMSO), was redesignated as the Space Division (SD).

1980

8 January	The first truly centralized word processing center within the Air Force Systems Command was officially declared operational at Headquarters AFSCF.
9 February	The AFSCF supported the successful launch and early orbit operations of the fifth NavStar/GPS satellite.
27 March	The AFSCF began the first round of negotiations concerning renewal of the lease pertaining to its Indian Ocean Station at the request of the Government of Seychelles (GOS). The initial GOS annual rental figure of $10 million and other "exhorbitant" lease terms requested during the session were taken under advisement.
26 April	Launch and early orbit operations of the sixth NavStar/GPS satellite received AFSCF support.
1 May	Ford Aerospace and Communications Corporation received a contract to design and construct an engineering prototype survivable transportable tracking station. This "Ground Station Link Survivability" contract called for development of a stand-alone ground station during 1984.
15 May	The first Network Interface Data System (NIDS) unit, a modified Varian 75 emulator buffer computer, was declared operational at Hq AFSCF.
17 June	After 102 consecutive months with a major accident flying safety record, the 6594th Test Group experienced a Class A mishap with a HH-53C helicopter.
1 July	Interim operating capability was achieved with the opening of the AFSCF's Operations Center. This function was a rough equivalent to a normal Air Force command post.
2 September	A two-volume CSOC system specification was published outlining the CSOC's mission, organizational arrangement, and basic operating parameters.
9 September	The AFSCF supported the launch of the NASA Geostationary Operational Environmental Satellite (GOES) used for weather data gathering purposes.

1 October — For the first time ever, a fully staffed and virtually full service Accounting and Finance Office was opened at Sunnyvale AFS. The function had been previously limited to one manning authorization with finance records and cash payments available at Travis AFB about 80 miles away from Sunnyvale.

31 October — The FLTSATCOM minimum on-orbit group was completed with the successful launch of the fourth vehicle in that series. The AFSCF established a command capability and moved the vehicle to its circular orbit.

22 December — The IBM/Federal Systems Division was selected as the contractor for the initial phase of the Data Systems Modernization (DSM) program at $92 million. With all options exercised, the potential value of that contract would rise to $248.4 million. The new data system offered by the DSM would provide centralized command and control of the entire AFSCF network and yield more efficient utilization of existing resources. The DSM was vital in order to provide greater support capabilities to meet a rising demand for space support and reduce life cycle costs by reducing equipment and operating personnel.

1981

8 January — The firm of King and Reif was awarded an architecture and design contract for a high priority, Program 106, satellite system, military construction program (MCP) project at Sunnyvale AFS.

10 March — Sunnyvale AFS completed its transition from a controlled area to restricted area thus increasing security for those areas having resources considered vital to the war-making capability of the United States.

26 March — The AFSCF received its fifth Air Force Outstanding Unit Award. It was awarded for the period 1 January 1977 through 19 January 1981.

12 April — Astronauts John W. Young and Robert Crippen were launched on the first spaceflight of the Space Shuttle. The AFSCF supported the mission which concluded on 14 April with return of the orbiter vehicle "Columbia" to Edwards AFB. Five AFSCF mission controllers received the Air Force Commendation Medal for their crucial support during the shuttle mission.

Space Shuttle versatility is depicted in this artist's conception of an orbiter deploying, retrieving, and servicing on-orbit satellites.

19 June — The United States and Government of Seychelles concluded nearly two years of intensive negotiations, proposals, and counter-proposals concerning a revised lease agreement for the Indian Ocean Station. Upon signing the new agreement, the AFSCF and the United States avoided a possible forced move of the tracking station from the Seychelles and thus preserved a valuable network resource.

6 August — The last of the current FLTSATCOM series of satellites was launched. The AFSCF supported the launch, performed on-orbit testing, and positioned the vehicle.

12 November — "STS-2," the second spaceflight of the shuttle "Columbia" was launched and received SCF support throughout the mission.

25 November — A force of 43 mercenaries led by Col "Mad Mike" Hoare, attempted a coup on the island of Mahe in the Seychelles. The Government of Seychelles (GOS) imposed a curfew through 2 December. The Indian Ocean Station secured its technical site and continued normal operations although available manpower represented just 40 percent of the total authorized strength.

1982

1 January — Construction of 100 military family housing units for Air Force personnel from Sunnyvale AFS began at NAS Moffett Field.

12 February — Dickman Brothers Inc., received a construction contract for a new satellite program support structure in front of Sunnyvale's main station entrance. The first two floors were to consist of covered parking and a third floor would be assigned as operations space. This was the first major building addition to SAFS since 1969. Ground-breaking occurred on 1 March 1982.

22-30 March — STS-3 received AFSCF support with the Indian Ocean Station using the bent pipe mode for the first time to support the Shuttle.

31 March — Colonel Floyd R. Stuart assumed command of the AFSCF replacing Col Joe E. Sanders who retired from active duty.

21 April — The 6594th Test Group received the Calendar Year 1981 USAF Flight Safety Award.

1 June — Full operational bent pipe capability was achieved at IOS after removal of the 1230 mTc computer. The computer was installed at Sunnyvale AFS as Command Data Processing Area (CUBE) II.

4 July — The AFSCF concluded its support of STS-4, last orbital flight test mission for the Space Shuttle. This mission, launched on 27 June, carried the first Department of Defense military payload.

17 August — Rebel Seychelles Army soldiers mutinied against senior officers and seized control of the Government of Seychelles Radio Station. Threats were made to kill up to 200 hostages unless abuses by those officers ceased. Soldiers swore allegiance to President Rene. A curfew was imposed through 20 August when loyal soldiers freed a number of hostages nearer 20, and regained control of the radio station.

1 September — Space Command (SPACECOM) was established as a new USAF Major Command thus consolidating many operational space activities. Headquarters SPACECOM was activated at Colorado Springs.

30 September — Systems Command and SPACECOM signed an agreement defining their roles in design, construction, management, procurement, installation, and checkout of equipment and facilities at Falcon AFS, Colorado, along with support incident to activating the Consolidated Space Operations Center (CSOC).

30 October — The first Titan 34D/Inertial Upper Stage (IUS) combination launch was supported by the AFSCF. The launch also placed the first DSCS III satellite on orbit. Although IUS transmitter signals were lost soon after launch, the control team turned to a DSCS II downlink which permitted tracking of the configuration before achieving orbit. Primary attitude control system failure required the mission control team to switch to a redundant ACS. Those problems were resolved and operability of the DSCS III satellite was maintained.

11 November — The AFSCF supported STS-5 through 16 November with on-orbit support through the Indian Ocean Station. Landing support was provided by sending data from Western Test Range tracking stations to NASA via a Vandenberg Tracking Station microwave link. During the STS-5 mission, the first satellite was deployed from a shuttle orbiter using a Payload Assist Module.

12 November — An 18-day inspection of the AFSCF at Sunnyvale and the 6594th Test Group in Hawaii was concluded by the AF Systems Command Inspector General (IG) with excellent results.

20 December — The AFSCF supported the first Block 5D-2 satellite launch in the Defense Meteorological Satellite Program (DMSP). The new series of satellites featured increased memory capacity of from 16,000 to 28,000 words, two batteries versus a single 5D-1 battery, and an improved sensor with redundant electronics.

1983

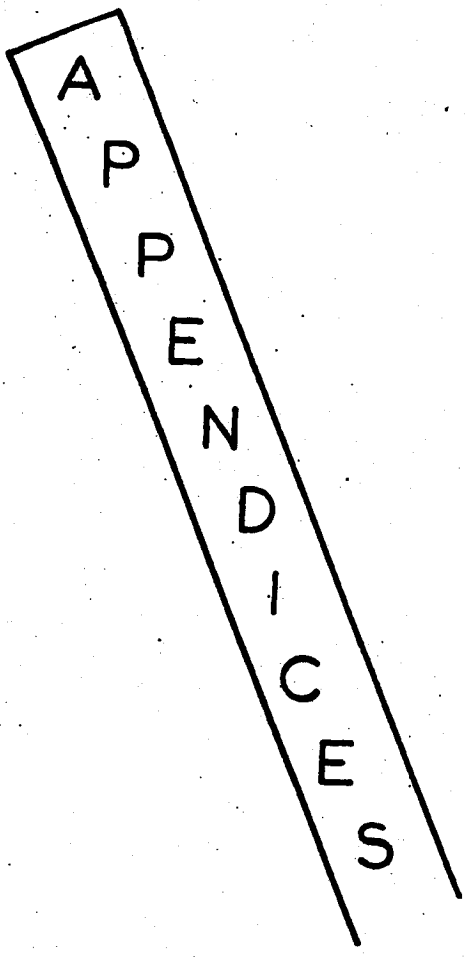
19 January — A ribbon cutting ceremony was held at NAS Moffett Field as the first Air Force families moved into new military family housing. The remaining 80 units would be occupied on a phased basis when completed.

1 February — Construction on an unaccompanied enlisted personnel facility project began at NAS Moffett Field.

3 February — The 6594th Test Group flew two HH-53 and four C-130 sorties to evacuate a seaman with a fractured skull from the USS New Orleans to Honolulu, Hawaii. Crews received credit for a "save" while performing the longest Air Force open-water rescue operation (750 miles) in history.

4-9 April — The AFSCF supported the sixth Space Shuttle flight (STS-6), and first for the Orbiter "Challenger," carrying the first NASA Tracking and Data Relay Satellite (TDRS) into space.

1 June — Ground-breaking occurred for the Data Systems Modernization (DSM) structure at Sunnyvale AFS.


APPENDICES

Appendix No. 1

6594th Test Wing and AFSCF Commanders

6594th Test Wing

Col Charles G. Mathison	6 Apr 59 - 20 Aug 60
Col Alvan N. Moore (Test Wing Satellite)	21 Aug 60 - 30 Aug 62
Col William K. Kincaid (Aerospace Test Wing)	31 Aug 62 - 30 Jun 65

Air Force Satellite Control Facility

Col Walter H. Hedrick, Jr.	1 Jul 65 - 31 Aug 66
Col William G. King, Jr.	1 Sep 66 - 30 Jul 67
B/Gen Jessup D. Lowe	31 Jul 67 - 28 Jul 69
B/Gen Lewis S. Norman, Jr.	29 Jul 69 - 31 May 71
Col John J. Schmitt, Jr.	1 Jun 71 - 31 Jul 74
Col Robert A. Van Arsdall	31 Jul 74 - 30 Jun 76
Col Ralph H. Jacobson	1 Jul 76 - 1 Mar 79
Col Joe E. Sanders	1 Mar 79 - 31 Mar 82
Col Floyd R. Stuart	31 Mar 82 -

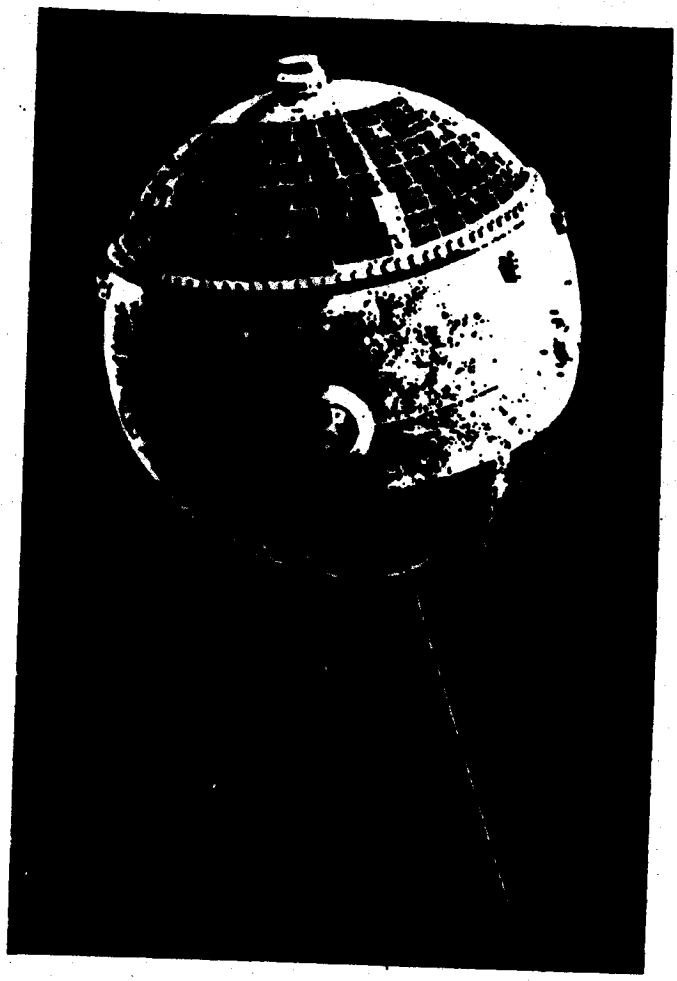
Appendix No. 2

TRACKING STATION LINEAGE

Station Name	Location	From	To
ANNETTE ISLAND	ALASKA	APR 59	JUN 63
CHINIAK/KODIAK	ALASKA	APR 59	SEP 75
FORT DIX	NEW JERSEY	OCT 61	APR 65
CAMP ROBERTS	CALIFORNIA	OCT 61	APR 65
DONNELLY FLATS/FORT GREELY	ALASKA	MAR 61	NOV 67
FAR NORTH/THULE	GREENLAND	OCT 61	PRESENT
GUAM	GUAM	SEP 65	PRESENT
INDIAN OCEAN	SEYCHELLES	AUG 63	PRESENT
KAENA POINT/HAWAII	OAHU, HAWAII	NOV 58	PRESENT
NEW HAMPSHIRE/NEW BOSTON	NEW HAMPSHIRE	OCT 59	PRESENT
VANDENBERG	CALIFORNIA	JUL 59	PRESENT
TCS OAKHANGER (shared resource)	UNITED KINGDOM	FEB 78	PRESENT

Appendix No. 3

SATELLITES

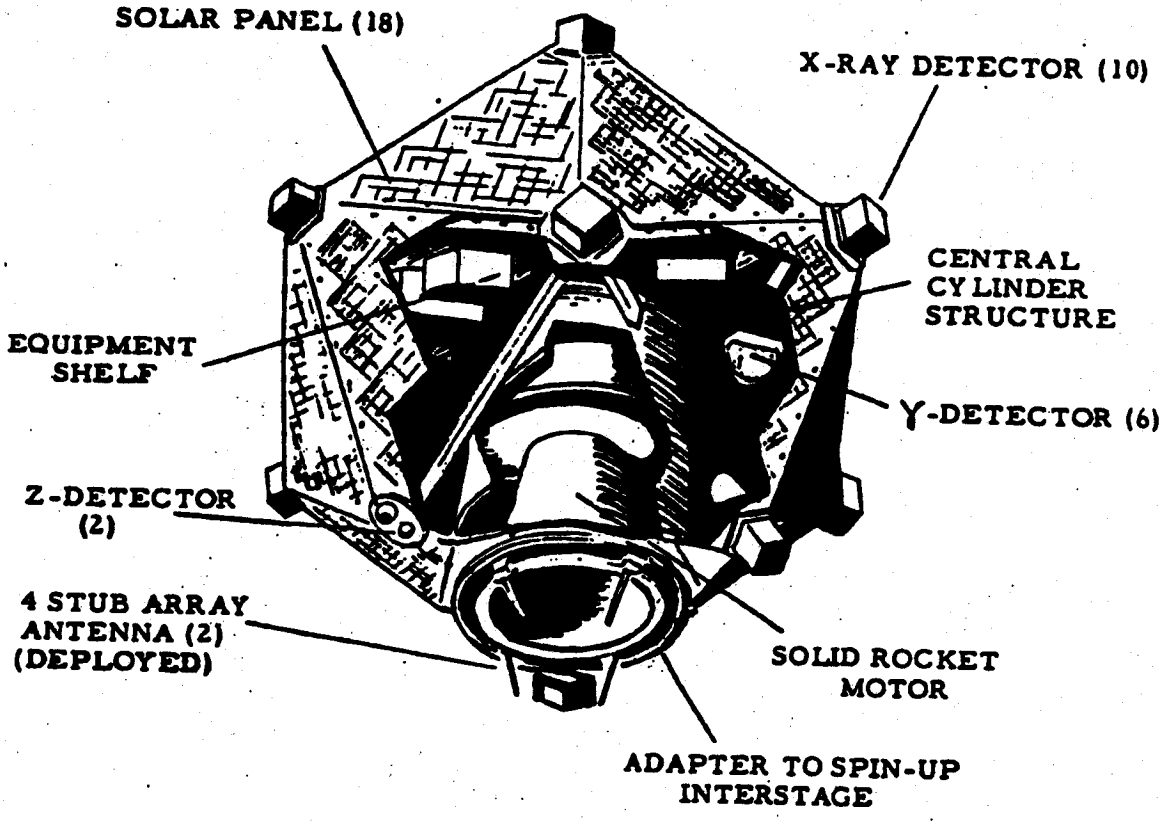


EXPLORER XVIII

Diameter: 28"

Height: 14"

1963



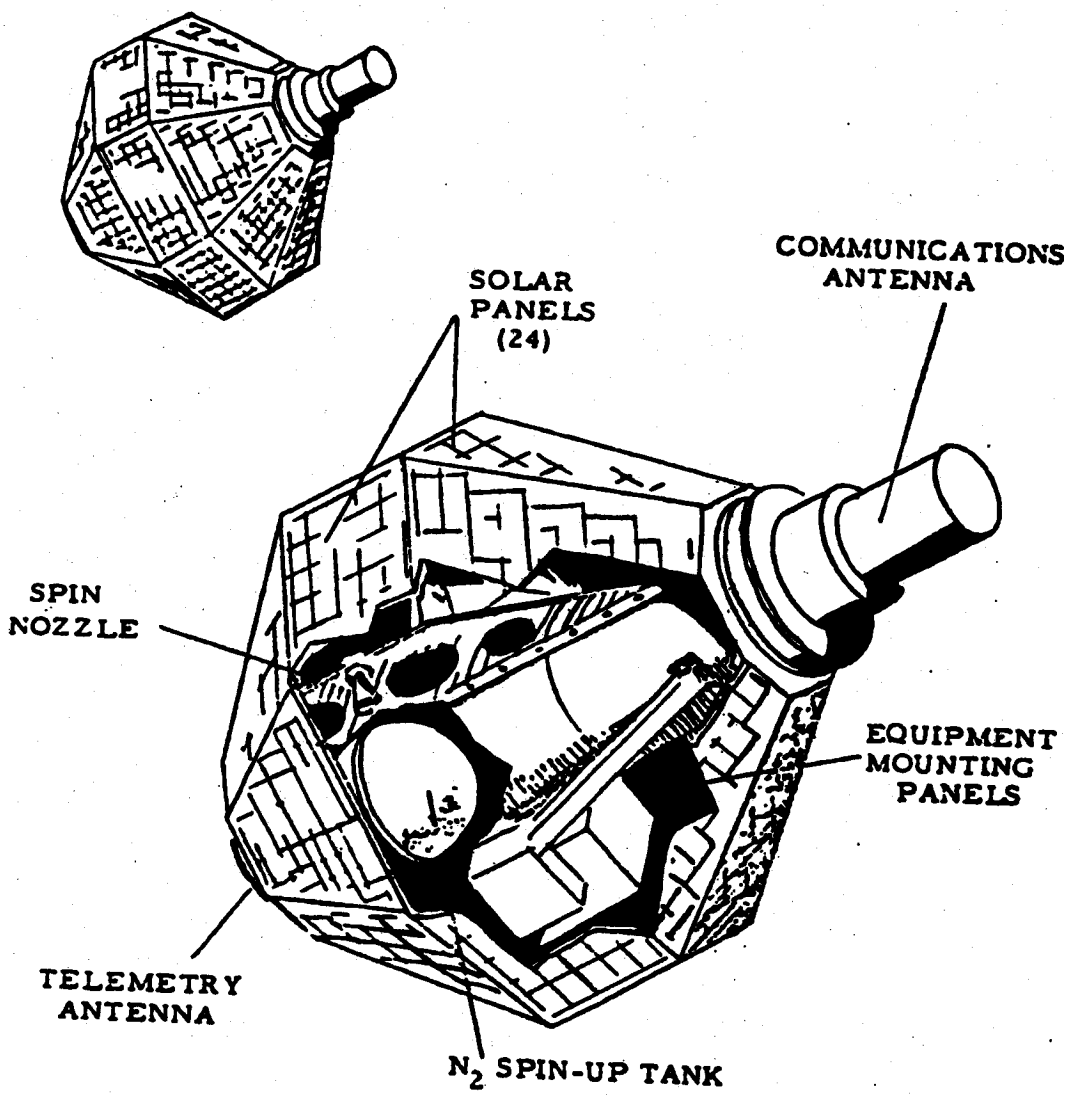
VELA I (Illustrated)

First Launch: 16 Oct 1963

Characteristics:

Width	58"
Height	45"
Weight (Liftoff)	498 lbs
Power (BOL)	99 watts
Design Life	6 months

(Vela Nuclear Detection Program Satellite)

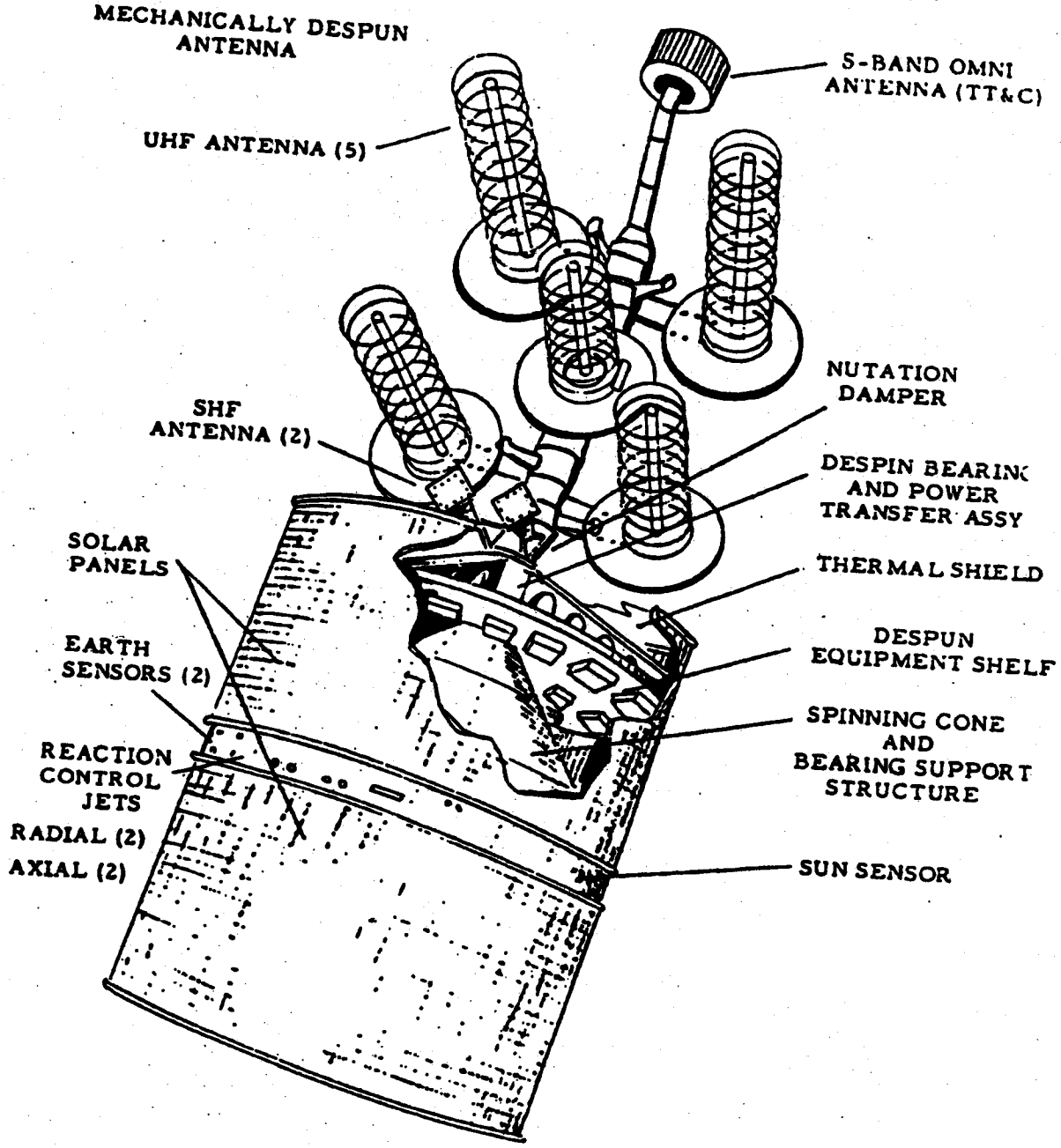


Initial Defense Communications Satellite Program (IDCSP)

First Launch: 16 Jun 1966

Characteristics:

Diameter	36"
Height	32"
Weight	100 lbs
Power (BOL)	40 watt
Design Life	1.5 years

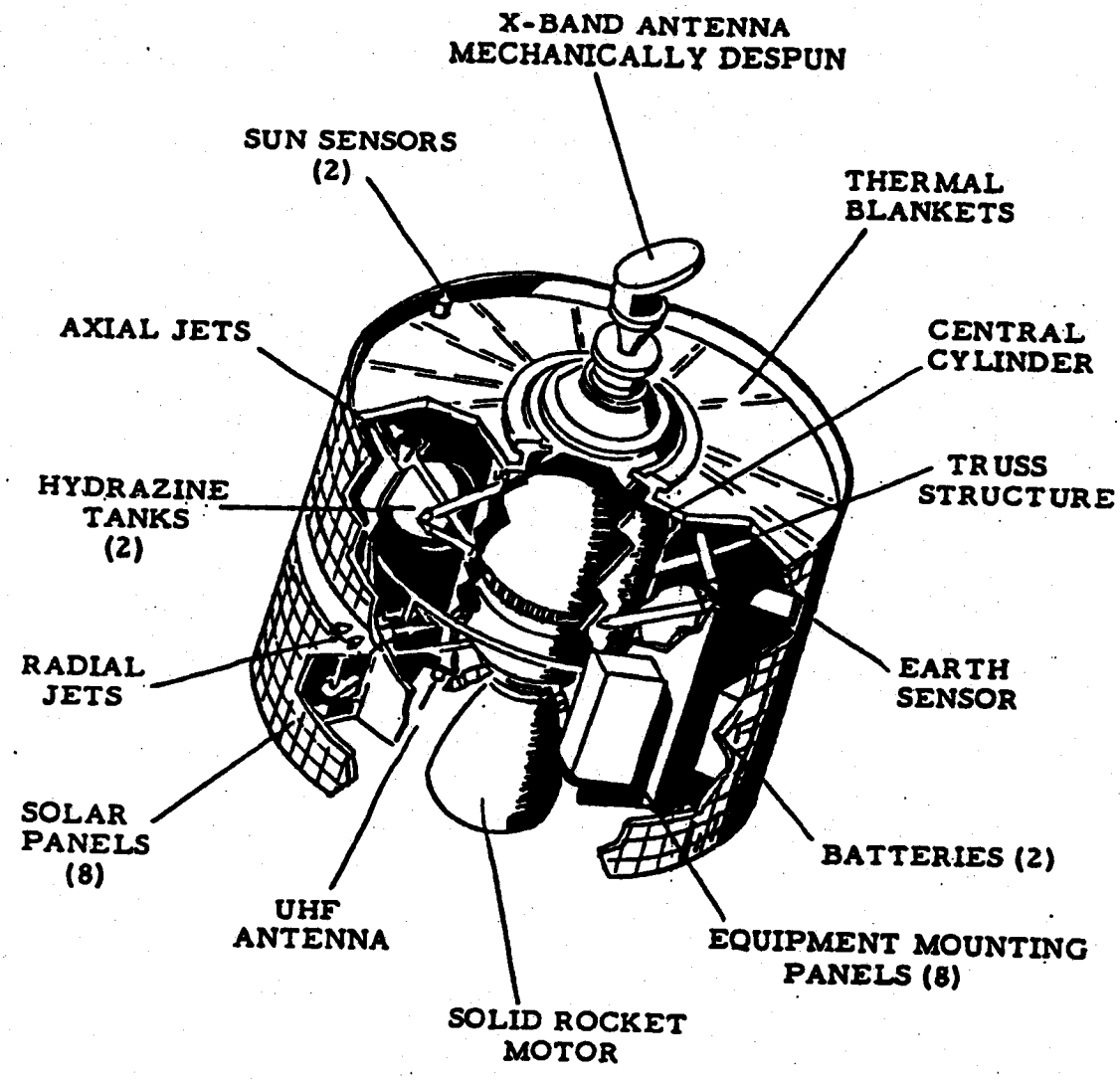


Tactical Communications Satellite (TACSAT)

Launch: 9 Feb 1969

Characteristics:

Diameter	9'
Height (Cyl)	11'
Ht. Overall	25'
Weight	1600 lbs
Power (BOL)	980 watts
Design Life	5 years

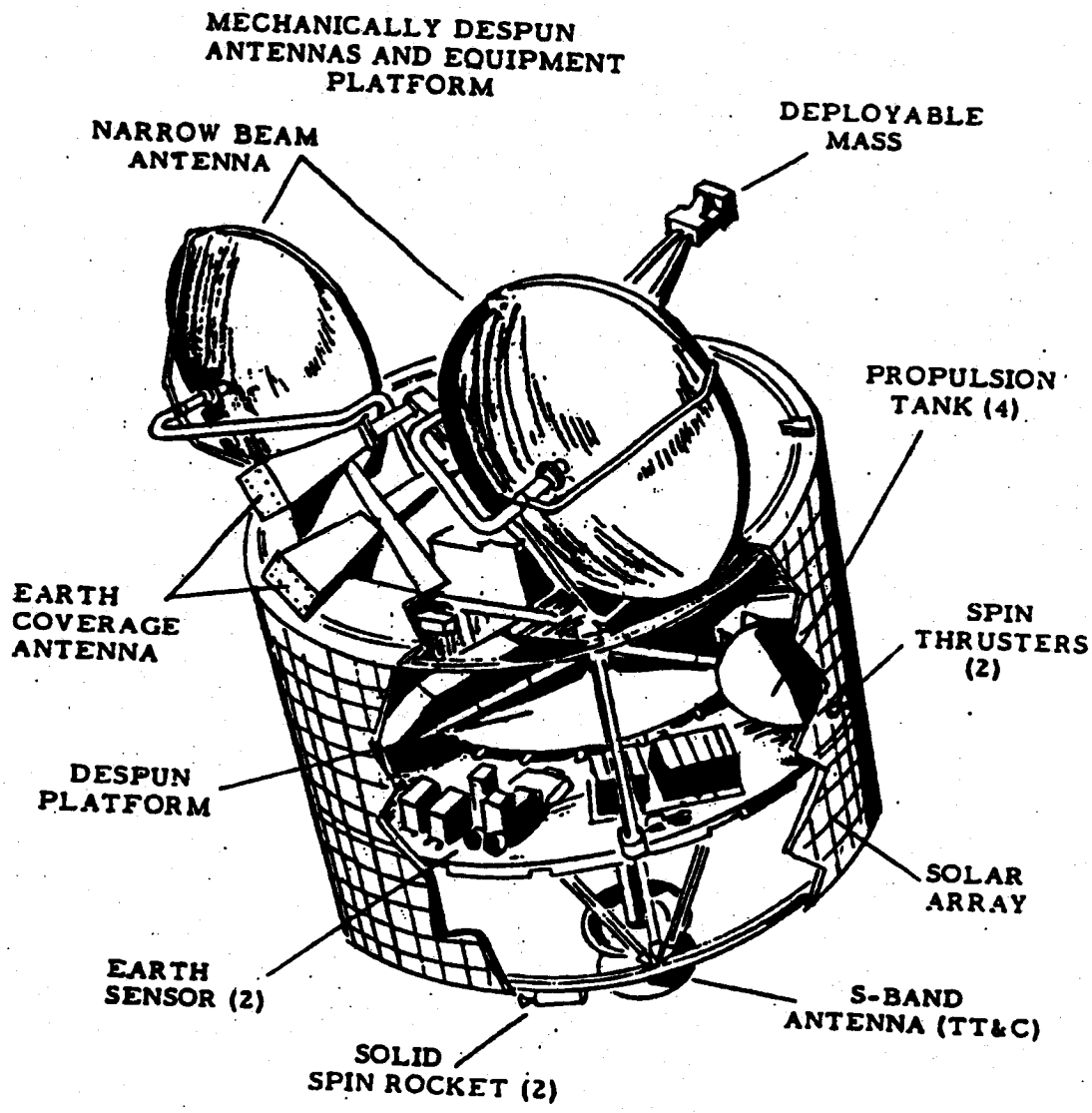


SKYNET/NATO II Communications Satellite

Launch: Skynet 1A, 21 Nov 1969
NATO IIA, 20 Mar 1970

Characteristics:

Diameter	54"
Ht. (Overall)	61.8"
Wt. (Liftoff)	535 lbs
Power (BOL)	113 watts
Design Life	3 years

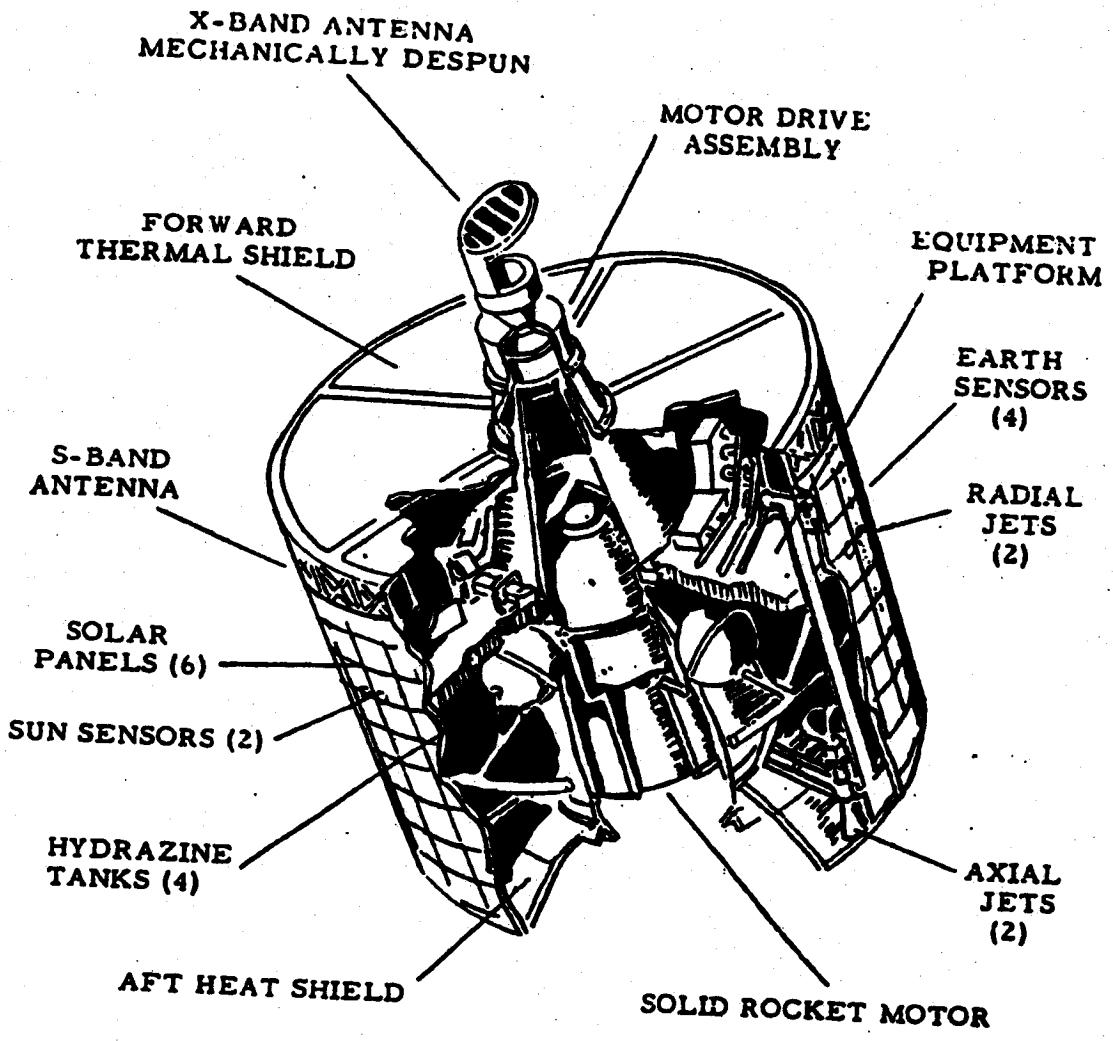


Defense Satellite Communications System
(DSCS II)

First Launch: 2 Nov 71

Characteristics:

Diameter	9'
Ht. (Overall)	13'
Wt. (Liftoff)	1150 lbs
Power (BOL)	535 watts
Design Life	5 years



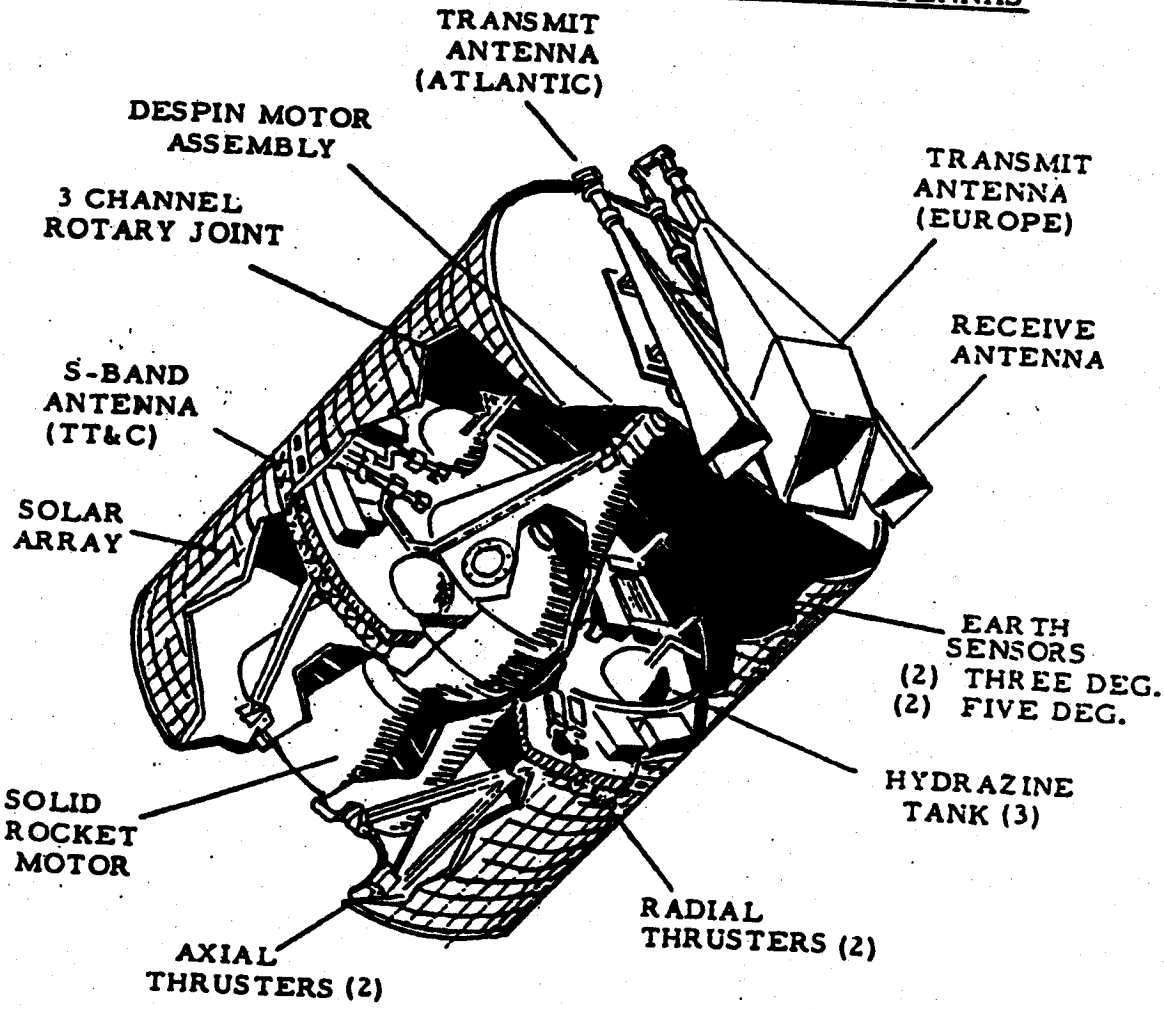
Skynet II Communications Satellite

First Launch: 18 Jan 1974

Characteristics:

Diameter	75"
Ht.(Overall)	82.3"
Wt.(Liftoff)	960 lbs
Power(BOL)	260 watts
Design Life	5 years

MECHANICALLY
DESPUN ANTENNAS



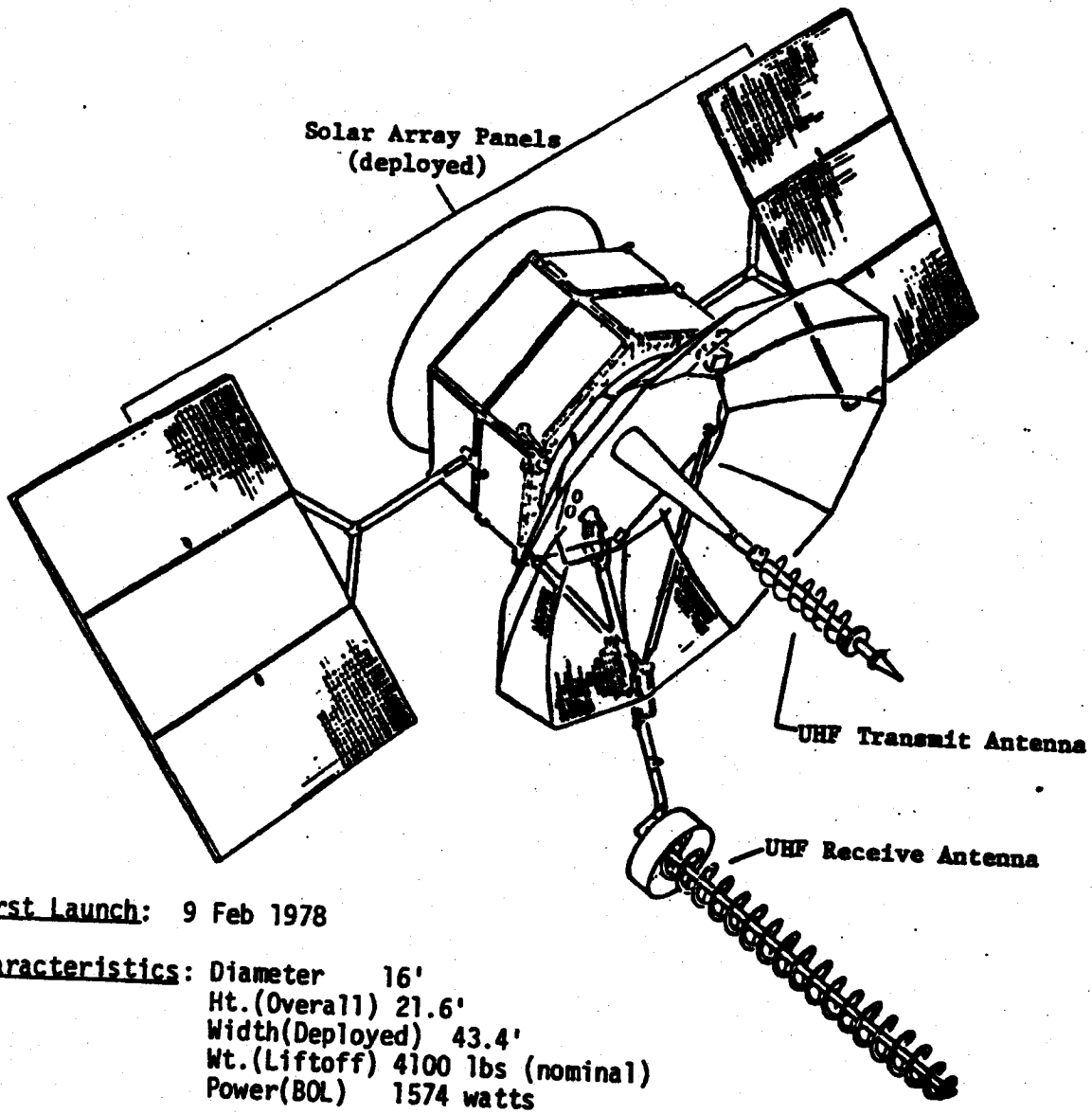
NATO III Communications Satellite

Launch: 22 Apr 1976

Characteristics:

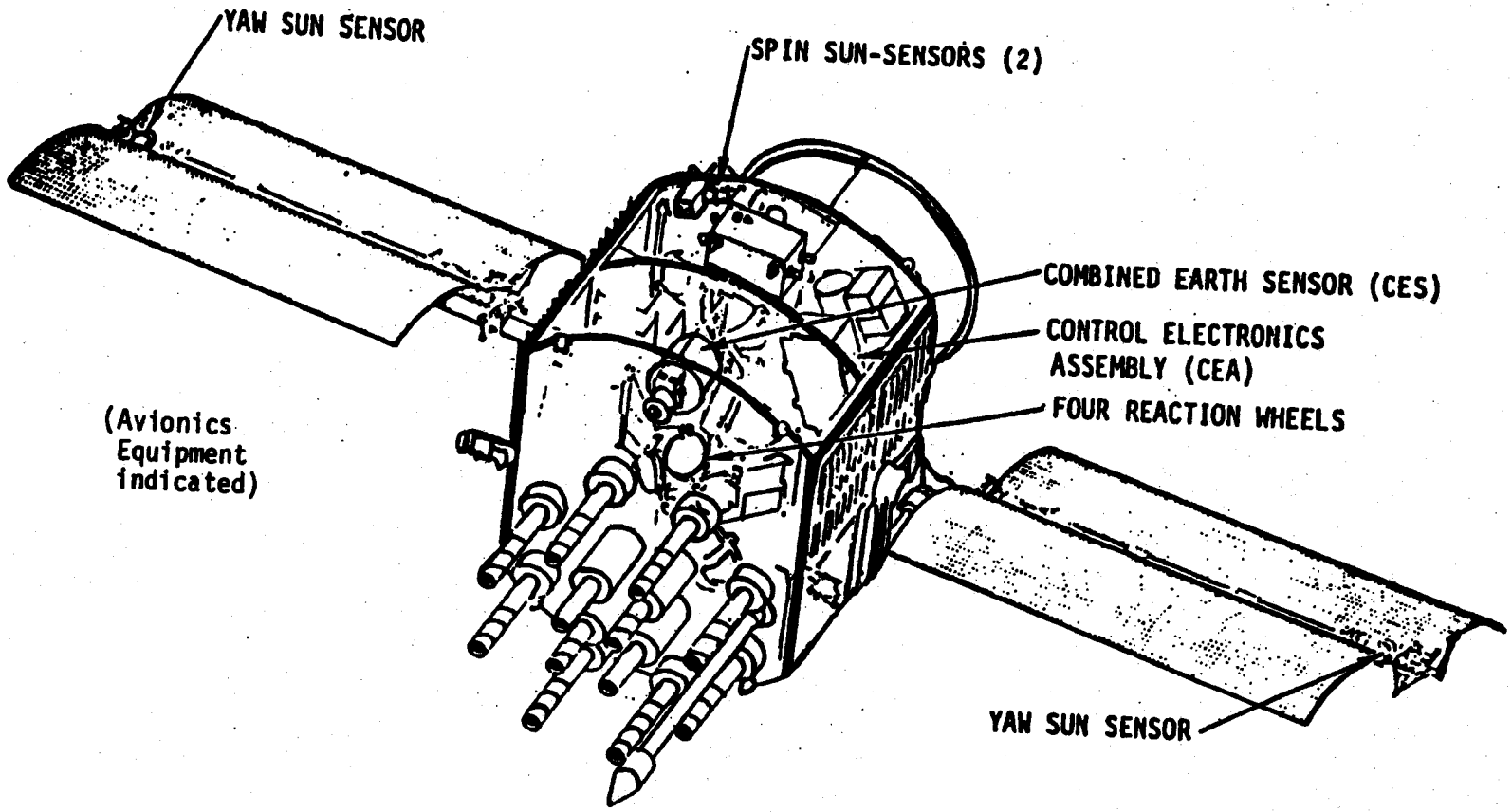
Diameter	86"
Ht.(Overall)	121.7"
Wt.(Liftoff)	1532 lbs
Power (BOL)	533 watts
Design Life	7 years

Fleet Satellite Communications (FLTSATCOM) Satellite



First Launch: 9 Feb 1978

Characteristics: Diameter 16'
Ht.(Overall) 21.6'
Width(Deployed) 43.4'
Wt.(Liftoff) 4100 lbs (nominal)
Power(BOL) 1574 watts



Navstar/Global Positioning System (GPS) Satellite

First Launch: 22 Feb 1978

Characteristics:

Diameter	6' (launch configuration)
Weight	950 lbs
Power (BOL)	410 watts
Design Life	5-7 years

Appendix No. 4

LINEAGE OF AFSCF SUBORDINATE UNITS

6594th Test Group

6594th Recovery Control Group (RCGp) designated and organized at Hickam AFB, Territory of Hawaii, ans assigned to 6594th Test Wing, Palo Alto, CA., eff 1 Nov 59	ARDC GO 224, 27 Oct 59
6594th RCGp redesignated as 6594th Test Group with no change in station or assignment, eff 10 Mar 66.	AFSC SO G-13, 1 Mar 66

Commanders

Lt Col Teuvo Ahola	Nov 59 - 21 Jun 62
Lt Col Donald L. Werbeck	22 Jun 62 - 26 Jun 62
Col William R. Morton	27 Jun 62 - 10 Jun 65
Col Erwin A. Meyer, Jr.	23 Jun 65 - 13 Aug 68
Col Richard C. Hall	14 Aug 68 - 4 Jun 71
Col William M. Quinn	5 Jun 71 - 6 Jul 72
Col Thomas M. Sumner	7 Jul 72 - 15 Jan 76
Col Robert E. Ross	16 Jan 76 - 28 Jul 78
Col Alfred H. Davidson, III.	28 Jul 78 - 23 Jun 81
Col Charles R. Dunn	23 Jun 81 -

DETACHMENT 1

6596th Instrumentation Squadron designated and organized at Vandenberg AFB, CA., assigned to 6594th Test Wing, Palo Alto, CA., eff 1 Jul 59	ARDC GO 54, 17 Jun 59
Redesignated as Detachment 1, Air Force Satellite Control Facility (AFSCF), with no change in station or assignment, eff 1 Oct 79.	Secretary of the Air Force announcement, Sep 79

Commanders

Capt Edwin G. Josey	1 Aug 59 - 12 Jan 60
Lt Col Carleton H. Jones	13 Jan 60 - 10 Jul 60
Col Lucius A. Perry, Jr.	11 Jul 60 - 31 Oct 61
Lt Col Carleton H. Jones	1 Nov 61 - 5 Dec 62
Col Vincent G. Feeney	7 Dec 62 - 7 Mar 63
Col Clifton L. Butler, Jr.	8 Mar 63 - 25 Aug 63
Col Vincent G. Feeney	26 Aug 63 - 30 Oct 63
Col Clifton L. Butler, Jr.	31 Oct 63 - 2 Jun 64
Col Vincent G. Feeney	3 Jun 64 - 13 Oct 64
Col Jerry Flicek	14 Oct 64 - 6 Jun 68
Col Gail S. Halvorsen	7 Jun 68 - 1 Mar 70
Col Charles W. Fellows, Jr.	2 Mar 70 - 9 Jun 71
Col Gordon E. Burrell	10 Jun 71 - 29 Jan 74
Lt Col Alex A. Pestrichella	30 Jan 74 - 26 Jun 75
Lt Col Roger C. Horrigan	27 Jun 75 - 28 Jun 78
Col Victor J. Bouquet, Jr.	28 Jun 78 - 12 May 81
Lt Col Richard C. Walsh	1 Jun 81 -

DETACHMENT 2

6594th Instrumentation Squadron designated and organized at Grenier Field, Manchester Municipal Airport, New Hampshire, and assigned to 6594th Test Wing, Palo Alto, CA., eff 1 Oct 59	ARDC GO 85, 17 Aug 59; ARDC GO 213, 14 Oct 59
Redesignated as Detachment 2, Air Force Satellite Control Facility, eff 1 Oct 79 with no change in station or assignment.	Secretary of the Air Force announcement, Sep 79; AFSC SO G-145, 18 Sep 79

Commanders

Col Glenn B. Daughton	1 Oct 59 - 31 Aug 64
Col Benjamin F. Smotherman	1 Sep 64 - 24 Sep 67
Lt Col James H. McGahee	25 Sep 67 - 29 Sep 68
Lt Col George W. Kreamer	30 Sep 68 - 13 Feb 72
Maj John C. Howay	14 Feb 72 - 23 Jul 74
Lt Col Philip J. Conran	24 Jul 74 - 28 Jul 77
Lt Col Douglas L. Smith	28 Jul 77 - 11 Aug 80
Lt Col Boyd F. Etheredge	11 Aug 80 -

DETACHMENT 3

Operating Location 5, 6594th Test Wing (Satellite), designated at Thule, Greenland, eff 15 Oct 61.	AFSC DCAS SO G-70, 11 Oct 61
Redesignated from OL-5 to Operating Location AA with no change in station or assignment, eff Jan-Apr 74.	Hist Rept, OL-5, 15 Jul 74
Redesignated from OL-AA to Detachment 3, Air Force Satellite Control Facility, with no change in station or assignment, eff 1 Oct 79.	Secretary of the Air Force announcement, Sep 79; AFSC SO G-145, 18 Sep 79

Commanders

Maj Odie E. Lawrence	15 Oct 61 - 18 Oct 62
Maj Frank J. Rostkowski	19 Oct 62 - 15 Jul 63
Maj James B. Reed	16 Jul 63 - 29 Jun 64
Maj John C. Orliski	30 Jun 64 - 16 Jun 65
Maj Walter D. Owings	17 Jun 65 - 31 Dec 65
1/Lt Edward J. Pabich	1 Jan 66 - 24 Mar 66
Maj Charles M. Schultz	25 Mar 66 - 27 Mar 67
1/Lt Joseph B. Kupec	8 Mar 67 - 3 Apr 67
Maj Lester Glew	4 Apr 67 - 23 Apr 68
Maj Donald A. Thompson	24 Apr 68 - 6 Apr 69
Maj Donald C. Hansen	7 Apr 69 - 31 Mar 70
Maj Henry M. Butler	1 Apr 70 - 2 Mar 71
Lt Col William J. Wilson	2 Mar 71 - 11 Feb 72
Lt Col James C. Collier, Jr.	12 Feb 72 - 14 Jan 73
Lt Col Thomas W. Moore, Jr.	15 Jan 73 - 6 Jan 74
Lt Col Durward Brandon	7 Jan 74 - 17 Jan 75
Maj Norman J. Grove	6 Jan 75 - 11 Jan 76
Maj Charles H. Stump	12 Jan 76 - 20 Jan 77
Maj Louis J. Adams	21 Jan 77 - 3 Jan 78
Maj Richard E. Bowen	3 Jan 78 - 5 Jan 79
Maj R.H. Smith	5 Jan 79 - 5 Feb 79
Maj James L. Grogan, III.	6 Feb 79 - 12 Feb 80
Maj Denis L. O'Connor	12 Feb 80 - 14 Feb 81
Maj Leslie G. Delong	14 Feb 81 - 15 Feb 82
Maj Robert W. Tribit	15 Feb 82 -

DETACHMENT 4

Operating Location 9, 6594th Test Wing (Satellite), designated at Mahe Island, Seychelles, Jan-Jun 63.	Hist Rept, 6594th Test Wing (Satellite), 31 Jul 63
Redesignated from OL-9 to Detachment 4, Air Force Satellite Control Facility with no change in station or assignment, eff 17 Jul 72.	Hist Rept, AFSCF/CCE, Jul 72

Commanders

Maj Norman H. Beaulieu	9 Sep 63 - 4 May 65
1/Lt James E. Harper	5 May 65 - 12 Jul 65
Maj Donald E. Jensen	12 Jul 65 - 30 Jun 68
Maj Martin F. Manion	1 Jul 68 - 5 Jun 70
Lt Col John G. Nash	25 Jun 70 - 14 Jun 72
Maj Carroll R. Michaud	15 Jun 72 - 29 May 74
Lt Col Larry D. Fitzgerald	30 May 74 - 30 Jun 76
Lt Col Robert B. Beveridge	1 Jul 76 - 12 Sep 77
Maj Leroy C. Young	12 Sep 77 - 28 Jun 78
Lt Col Joe M. Leeper	28 Jun 78 - 11 Jun 79
Lt Col George W. Buchanan	14 Jun 79 - 15 Jun 80
Lt Col Peter F. Peterson	15 Jun 80 - 20 Jun 81
Lt Col James B. Church, Jr.	20 Jun 81 - 30 Jun 82
Maj G. Middleton	30 Jun 82 -

DETACHMENT 5

Operating Location 10, site selection 27 Apr 65 and Host-Tenant Agreement between 6594th Aerospace Test Wing/3960th Support Wing (SAC), Andersen AFB, Guam, concluded for Mobile Tracking Station at Northwest Field, Guam, eff 21 May 65.	Hist Rept, AFSCF/OL-10, 31 Jan 66
Redesignated from OL-10 to Operating Location OL-AD, Air Force Satellite Control Facility, eff Jan-Apr 74.	Hist Rept, AFSCF/CCE, Jul 74
Redesignated from OL-AD to Detachment 5, AFSCF, with no change in station or assignment, eff 1 Oct 79.	Secretary of the Air Force announcement, Sep 79; AFSC SO G-145, 18 Sep 79

Commanders

Maj Steven E. Hill	1 Jan 66 - 13 Jan 67
Maj Donald B. Scott	14 Jun 67 - 6 Jun 69
Maj Richard W. Pryor	7 Jun 69 - 16 May 71
Lt Col Thomas E. Timothy	17 May 71 - 5 Jun 73
Maj Joe M. Leeper	6 Jun 73 - 11 Apr 76
Maj Leroy C. Young	12 Apr 76 - 4 Jul 77
Maj Bedford D. Blevins	5 Jul 77 - 9 Jul 80
Maj Thomas R. Tate, III.	9 Jul 80 - 1 Jul 82
Maj M. Harvey	1 Jul 82 -

DETACHMENT 6

6593d Instrumentation Squadron designated and organized at Wheeler AFB, Territory of Hawaii, and assigned to 6594th Recovery Control Group (6594th Test Wing), eff 1 Nov 59.	ARDC GO 224, 27 Oct 59
Official location changed unit location from Wheeler AFB to Hickam AFB, Hawaii, eff 7 Jun 60.	ARDC GO 56, 7 Jun 60
Reassigned from 6594th Test Group to Hq AFSCF, eff 1 Jul 72.	AFSC GO G-78, 20 Jun 72
Redesignated from 6593d Instrumentation Squadron to Detachment 6, AFSCF, with no change in station or assignment, eff 1 Oct 79.	Secretary of the Air Force announcement, Sep 79; AFSC SO G-145, 18 Sep 79

Commanders

Lt Col David L. Henderson	15 Jun 60 - 31 Dec 60
Lt Col Charles D. Fisher, Jr.	1 Jan 61 - 1 Jul 63
Lt Col Paul O/Brien	2 Jul 63 - 16 Jun 65
Lt Col John W. Oliver	17 Jun 65 - 17 Aug 67
Lt Col William H. Gaines	18 Aug 67 - 15 Jul 70
Lt Col Oliver W. Fix	16 Jul 70 - 27 Sep 72
Maj David W. Stell	28 Sep 72 - 15 Aug 76
Lt Col John P. Porter	16 Aug 76 - 1 Jul 79
Lt Col Philip P. Yarborough	1 Jul 79 - 26 Jun 81
Maj Joseph R. Lenhoff	26 Jun 81 -

OPERATING LOCATION AE

Designated and activated as Telemetry and Command Station (TCS) Oakhanger, United Kingdom, and assigned to Hq AFSCF, eff 15 Feb 78.	AFSC SO G-11, 27 Jan 78

Liaison Officers

Maj Herbert J. Jansen	14 Apr 78 - 1 Jun 82
Capt John B. Ashbaugh	1 Jun 82 -

6594th AIR BASE SQUADRON

6594th Support Group designated and organized at Sunnyvale, CA., and assigned to Hq AFSCF, eff 1 Jul 65.	AFSC SO G-52, 21 Jun 65
Redesignated as 6594th Air Base Squadron, AFSCF, with no change in station or assignment, eff 15 Jan 73.	AFSC SO G-146, 7 Nov 72

Commanders

Major James V. Gilliland	1 Jul 65 - 31 Aug 66
Lt Col Charles P. Russell	1 Sep 66 - 30 Apr 68
Maj Frederick H. Goessel, Jr.	1 May 68 - 7 Jul 68
Lt Col Edward H. Graalfs	8 Jul 68 - 18 Jul 69
Lt Col Ronald W. Hartrim	19 Jul 69 - 30 Apr 70
Lt Col Philip Jeter, Jr.	1 May 70 - 30 Sep 71
Lt Col Paul R. Myers	1 Oct 71 - 19 Aug 73
Lt Col Milton M. Clark	20 Aug 73 - 31 Aug 78
Lt Col Gregory M. Risch	1 Sep 78 - 1 Apr 80
Lt Col Richard M. Scredon	1 Apr 80 - 7 Aug 81
Lt Col James E. Reed	7 Aug 81 - 29 Sep 82
Lt Col Ellsworth E. Wiggins	29 Sep 82 -

UNITS PREVIOUSLY ASSIGNED TO THE AFSCF

6593d TEST SQUADRON (SPECIAL)

Designated and organized at Hickam AFB, Territory of Hawaii, and assigned to Hq ARDC with attachment to Hq AFBMD, Los Angeles, CA., for admin and operational control, eff 1 Aug 58.	ARDC GO 38, 22 Jul 58
Operational control reassigned to 6594th Test Wing, Palo Alto, CA., with no change in station, eff 22 Jun 59.	Ltr, AFBMD/WDSPR, 22 Jun 59
Reassigned from Detachment 2, Hq ARDC (AFBMD), to 6594th Recovery Control Group with no change in station, eff 1 Nov 59.	ARDC GO 224, 27 Oct 59
Inactivated with personnel and equipment reassigned to 6594th Test Group, Hickam AFB, Hawaii, eff 1 Jul 72.	AFSC SO G-82, 23 Jun 72

Commanders

Maj Joseph G. Nellor	1 Aug 58 - 8 Jul 62
Lt Col Owen E. Pratt, Jr.	9 Jul 62 - 30 Jun 63
Lt Col Joe B. Thomson, Jr.	1 Jul 63 - 13 Jun 65
Lt Col Grover P. Moore, Jr.	14 Jun 65 - 12 Jul 66
Lt Col Harold B. Owens	13 Jul 66 - 13 Jul 68
Lt Col Paul Stinson	14 Jul 68 - 8 Oct 70
Lt Col Marshall H. Fletcher	9 Oct 70 - 30 Oct 71
Lt Col Edward T. Lynch, Jr.	31 Oct 71 - 1 Jul 72

UNITS PREVIOUSLY ASSIGNED TO THE AFSCF

6594th TEST SQUADRON (AIR FORCE SATELLITE PHOTOGRAPHIC PROCESSING LABORATORY (AFSPPL)

Designated and organized at Westover AFB, MA., and assigned to 6594th Test Wing (Satellite), Sunnyvale, CA., eff 20 Feb 61.	ARDC SO G-15, 16 Feb 61
Reestablished as the Air Force Special Projects Production Facility and reassigned from Hq AFSCF to Space Systems Division (SSD), Jul-Dec 65.	Ltr, AFSCF/SSOE, "Hist Rept," 11 Feb 66

6594th LAUNCH SQUADRON

Designated and organized at Vandenberg AFB, CA., and assigned to 6594th Test Wing, eff 1 Jun 59.	ARDC GO 40, 6 May 59; ARDC GO 39, 21 Nov 60
Discontinued eff 15 Jul 61.	AFSC SO G-71, 28 Jun 61

6594th DATA PROCESSING SQUADRON

Designated and organized at Lowry AFB, CO., and assigned to 6594th Test Wing, eff 1 Jul 59.	ARDC GO 54, 17 Jun 59
Redesignated as 4999th Data Processing Squadron with no change in station or assignment, eff 1 Oct 59.	ARDC GO 207, 25 Sep 59
Discontinued eff 1 Oct 60.	ARDC GO 96, 21 Sep 60

UNITS PREVIOUSLY ASSIGNED TO THE AFSCF

OPERATING LOCATION 4

Operating Location 3 designated and activated at Annette Island, Alaska, assigned to 6594th Test Wing, eff 6 Apr 59.	ARDC GO 28, 3 Apr 59
Discontinued eff 14 Mar 61.	AFBMD SO G-15, 3 Mar 61
Operating Location 4 designated and activated at Annette Island, Alaska, assigned to 6594th Test Wing (Satellite), eff 15 Oct 61.	AFSC SO G-70, 11 Oct 61
Deactivated eff Jan-Jun 63.	Hist Rept, 6594th Test Wing/SSOC, 5 Aug 63.

OPERATING LOCATION 8*

Operating Location 3 designated and activated at Donnelly Flats, Alaska, assigned to 6594th Test Wing (Satellite), eff 15 Mar 61.	AFBMD SO G-15, 3 Mar 61
Discontinued as OL-3 and designated Detachment 1, 6594th Aerospace Test Wing, Fort Greely, Donnelly Flats, Alaska, eff 15 Apr 62.	AFSC SO G-40, 2 Apr 62
Discontinued eff 1 Jul 65; Designated Operating Location 8, AFSCF.	AFSC SO G-52, 21 Jun 65
Inactivated eff Nov-Dec 67.	Hist Repts, AFSCF and OL-8, Jan-Jun 68

* Donnelly Flats/Ft. Greely Tracking Station constructed in 1961; operated and funded by USAF with one officer, one enlisted personnel authorizations. Station provided sporadic specific program support reaching operational ready status 6 Apr 66.

UNITS PREVIOUSLY ASSIGNED TO THE AFSCF

OPERATING LOCATION 1

Designated Operating Location 1, assigned to 6594th Test Wing, and located at Edwards AFB, CA., eff 6 Apr 59.	ARDC GO 28, 3 Apr 59
Deactivated 30 Jun 73 and consolidated with 6594th Test Group at Hickam AFB, Hawaii, eff 1 Jul 73.	AFSC SO G-14, 22 Feb 73

OPERATING LOCATION AE

Designated Operating Location 2, assigned to 6594th Test Wing, and located at Chiniak Point, Kodiak, Alaska, eff 6 Apr 59.	ARDC GO 28, 3 Apr 59
Redesignated as Operating Location AE, Kodiak Tracking Station, Alaska, with assignment to AFSCF, eff Jan-Jun 74.	Hist Rept, AFSCF/CCE, Jul 74
Inactivated eff 30 Sep 75.	AFSC SO G-76, 3 Jul 75

Commanders

Capt Derrill D. Hartley	Jan 65 - Jan 67
Maj Nelson Halstead	Jan 67 - 30 Jun 67
Lt Col Titus C. Hall	1 Jul 67 - 6 Jun 69
Maj Alex A. Pestrichella	7 Jun 69 - 24 Jun 71
Maj John C. Macpherson	26 Jun 71 - 10 Jun 73
Maj Robert P. Kellar	11 Jun 73 - 30 Sep 75

UNITS PREVIOUSLY ASSIGNED TO THE AFSCF

DETACHMENT 1, AFSCF

Designated and organized at Sunnyvale, CA., eff 1 Jul 65.	AFSC SO G-52, 21 Jun 65
Inactivated w/personnel, equipment, and functions reassigned to Hq AFSCF, Sunnyvale AFS, CA., eff 1 Jul 77.	AFSC SO G-58, 3 May 77

Commanders

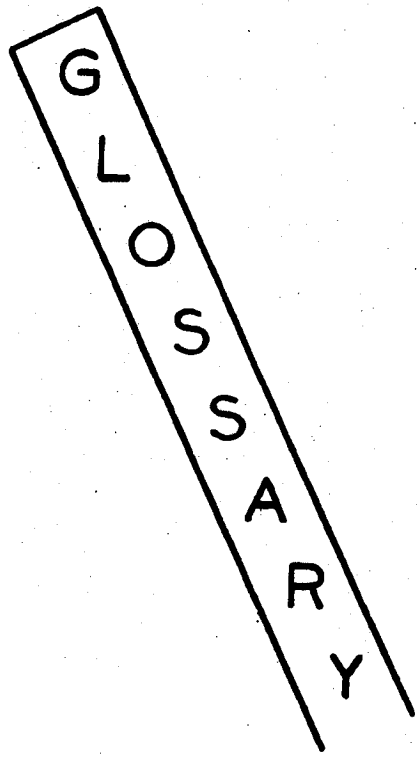
Col Charles E. Hughes	1 Jul 65 - 31 Dec 70
Col Robert B. Savage	1 Jan 71 - 31 Aug 72
Col Robert A. Van Arsdall	1 Sep 72 - 21 Sep 73
Col George T. James, Jr.	22 Sep 73 - 31 Jul 74
Col John W. Browning	7 Aug 74 - 30 Jun 77

CAMP PARKS COMMUNICATIONS ANNEX

Nominally assigned as Camp Parks Radiometric Test Facility, Pleasanton, CA., to AFSCF, eff 1 Jul 70.	Hist Rept, AFSCF/SOE, 26 Jan 71
Designated as Operating Location AB and activated with no change in station or assignment, eff 15 Jul 75.	AFSC SO G-76, 3 Jul 75
OL-AB converted to contractor operation and inactivated with annex becoming the responsibility of Hq AFSCF staff function, eff 16 Feb 78.	AFSC SO G-37, 20 Mar 78

Commanders

Lt Col John C. MacPherson	15 Aug 75 - 31 Dec 76
Maj Joseph L. Jacobsen	1 Jan 77 - 16 Feb 78

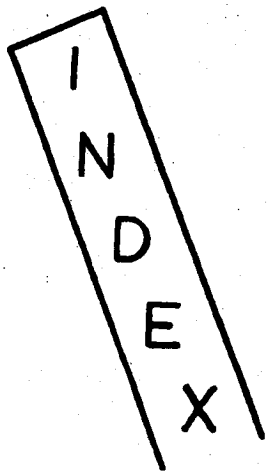

GLOSSARY

GLOSSARY

ADS	Advanced Data System
AFBMD	Air Force Ballistic Missile Division
AFSATCOM	Air Force Satellite Communications
AFSC	Air Force Systems Command
AFSCF	Air Force Satellite Control Facility
ARDC	Air Research and Development Command
ARPA	Advanced Research Projects Agency
ASTC	Advanced Satellite Test Center
BPS	Bits per second
BUSTC	Back-Up Satellite Test Center
CDC	Control Data Corporation
COMSAT	Communications Satellite
CSOC	Consolidated Space Operations Center
DCA	Defense Communications Agency
DLT	Data Link Terminal
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
DSCS	Defense Satellite Communications System
DSIS	DSCS/Satellite Control Facility Interface System
ESD	Electronic Systems Division
EXCELS	Expanded Communications Electronics System
FLTSATCOM	Fleet Satellite Communications

GOS	Government of Seychelles
GPS	Global Positioning System
GTS	Guam Tracking Station
HTS	Hawaii Tracking Station
IDCSP	Initial Defense Communications Satellite Program
INS	Instrumentation Squadron
IOC	Initial Operating Capability
IOS	Indian Ocean Station
IWBC	Interim Wideband Communications
JSC	Johnson Space Center
KSC	Kennedy Space Center
MCC	Mission Control Complex
MOL	Manned Orbiting Laboratory
MSAP	Multi-Satellite Augmentation Program
MTS	Mobile Tracking Station
NATO	North Atlantic Treaty Organization
NBS	New Boston Station
NHS	New Hampshire Station
NRD	National Range Division
OL	Operating Location

PICE	Programmable Integrated Control Equipment
PRELORT	Precision Long Range Tracking (radar)
RVCF	Remote Vehicle Checkout Facility
SAFS	Sunnyvale Air Force Station
SAMSO	Space and Missile Systems Organization
SCF	Satellite Control Facility
SD	Space Division
SGLS	Space-Ground Link Subsystem
SOPC	Shuttle Operations Planning Center
SSD	Space Systems Division
STA	Satellite Test Annex
STC	Satellite Test Center
STS	Space Transportation System
SYNCOM	Synchronous Communications
TT&C	Telemetry, Tracking, and Commanding
TTS	Thule Tracking Station
VERLORT	Very Long Range Tracking (radar)
VTS	Vandenberg Tracking Station
WDD	Western Development Division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