Edwards AFB

Then and Now

Cover Photo: A Boeing B-47 Stratojet over the South Base flightline, circa 1951.
The hangars in the background were later moved to Main Base and designated hangars 1207 and 1210.

EDWARDS AFB... THEN AND NOW

A PICTORIAL TOUR

AIR FORCE TEST CENTER HISTORY OFFICE

EDWARDS AFB, CALIFORNIA

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INTRODUCTION

by

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2001

The origins of Edwards AFB date to September of 1933 when Lieutenant Colonel Henry H. "Hap" Arnold established Muroc Bombing and Gunnery Range, within the confines of present-day Edwards AFB, as a remote training site for his March Field squadrons. As World War II approached, the range was transformed into a major air combat training base and the primary mission at Muroc became the final training for aircrews prior to overseas deployment.

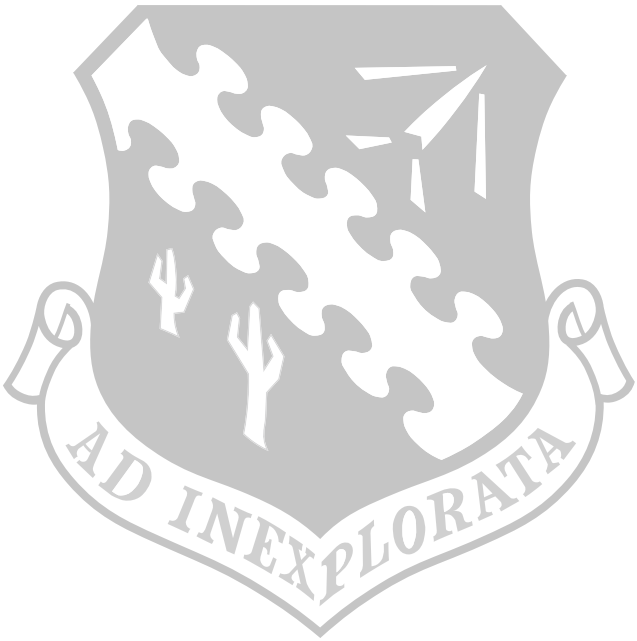
A completely different type of mission, however, was soon to get underway. In the Spring of 1942, military officials began searching for a location to test America's first jet aircraft, the XP-59A. The highly classified nature of the program compelled the military to find an isolated site; the urgent need to complete the program without delay dictated a location with good, year-round flying weather. The site selected was along the north shore of Rogers Dry Lake, about six miles away from the training base at Muroc. While Wright Field, Ohio remained the hub of flight test operations throughout the war, the volume of test activity at Muroc continued to increase.

By 1946, a new type of activity occurred on the base – the rocket-powered X-1 was the first in a long series of experimental aircraft designed to answer fundamental questions, to probe the most challenging unknowns of flight, and solve their mysteries. It was in the X-1, on 14 October 1947, that Captain Chuck Yeager became the first man to exceed the speed of sound. With the X-1, flight testing at Muroc began to assume two distinct identities: highly experimental programs and evaluations of aircraft proposed for the operational inventory.

In 1949, the base was renamed in honor of Captain Glen W. Edwards, killed in the crash of a YB-49 Flying Wing, and, in 1951, it was officially designated as the Air Force Flight Test Center. That same year, the United States Air Force (USAF) Test Pilot School moved to Edwards from Wright Field.

Over the next 50 years, the Air Force Flight Test Center (AFFTC) played a pre-eminent role in forging the future of aerospace. The Center tested and supported the development of virtually every aircraft system in the USAF inventory. It witnessed more major milestones in flight than anywhere else in the world, and served as the cutting edge of every major development that transformed the field of flight--the turbojet revolution, the supersonic and hypersonic breakthroughs, the space revolution, systems revolution, and, more recently, the stealth revolution. Edwards Air Force Base's (AFB) unique blend of natural, technical and human resources transformed it into a national asset and a place synonymous in the public mind with man's boldest adventures in flight.

Many of the sites that have figured prominently in the heritage of Edwards AFB and the AFFTC are either inaccessible or have few remaining traces. This booklet has been compiled to provide insight into these sites and, thus, provide for a better understanding and appreciation of the role Edwards AFB has played in the history of flight.



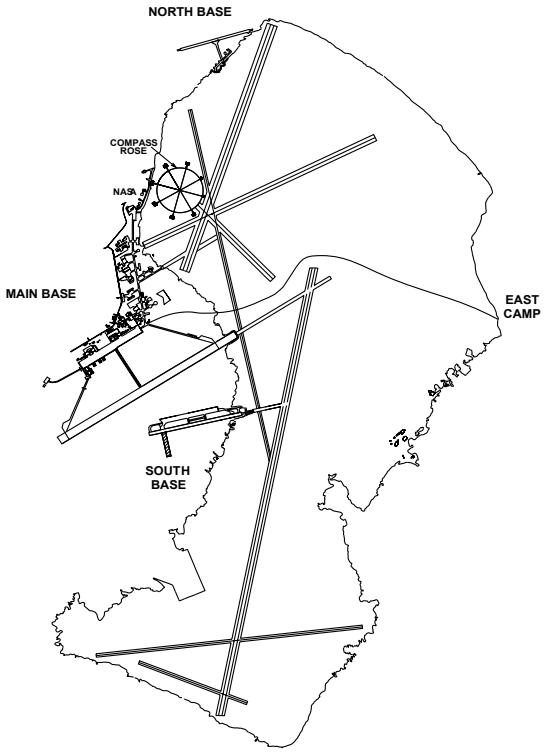
The emblem of the U.S. Air Force Test Center was approved in May of 1953. It depicts a cloud layer separating a desert landscape from the black unknown of outer space upon which is superimposed an aerodynamic shape with shock waves symbolizing the Center's flight test and research mission. *Ad Inexplorata*, the Center's motto, is Latin for Toward the Unexplored. For the men and women of Edwards, it has always been more than just a motto, for it has reflected an attitude extending from the Center's past, through its present, and into its future.

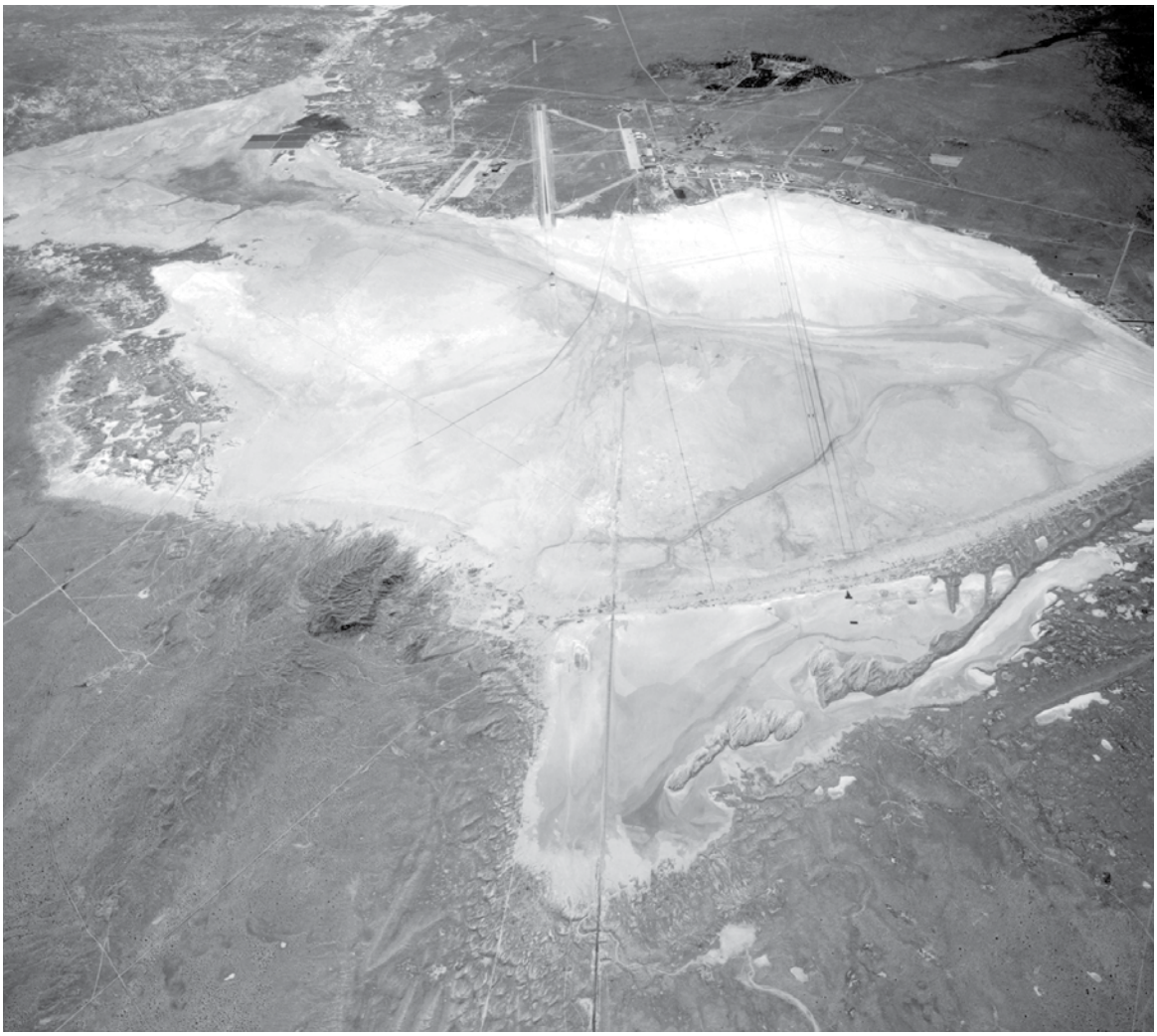
TABLE OF CONTENTS

OVERVIEW

ROGERS DRY LAKE

The Air Force Flight Test Center's stature as the nation's premier flight test facility stems from a unique blend of natural resources that cannot be matched anywhere else on earth: excellent year-round flying weather, relative isolation and varied topography—including the lowest and highest points in the contiguous states—and the vast expanse of Rogers Dry Lake. The largest geological formation of its kind in the world, the 47.3 square miles of extremely flat, concrete-like lakebed surface provides a spacious natural landing field. Rogers Dry Lake has been the landing site for scores of milestone flights and, as an emergency landing field, it has saved countless lives and billions of dollars worth of aircraft. Flight test pioneer Major General Albert Boyd called it "God's gift to the U.S. Air Force."





The first flight of the North American F-107 fighter-bomber on 10 September 1956 ended on the lakebed after its drag chute failed to deploy upon landing and the aircraft rolled off the end of the main concrete runway. The aircraft continued to skid across the lake bed until finally coming to a stop approximately 22,000 feet from where it first touched down. The pilot was uninjured and the aircraft was ready to fly again within two weeks.

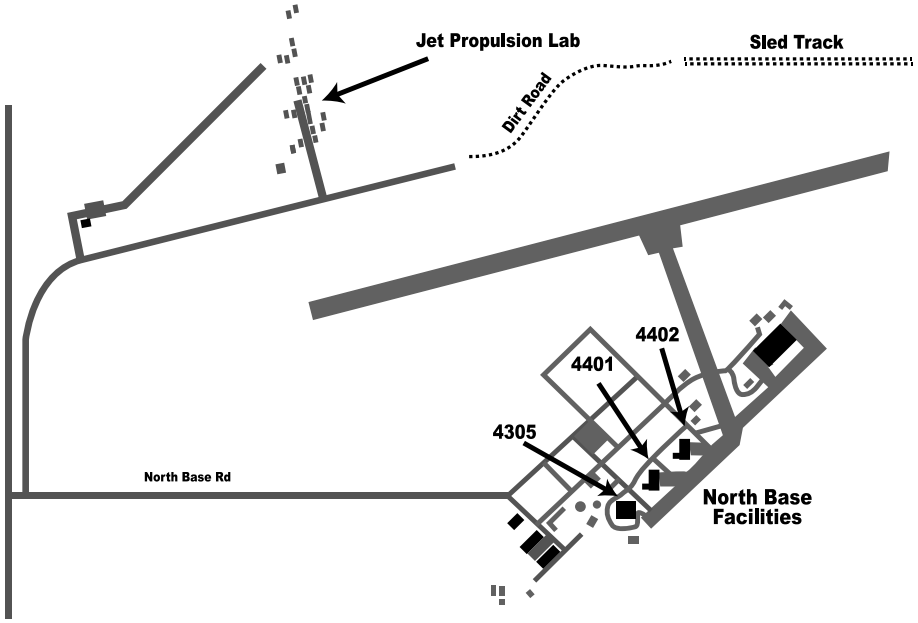
Because of the safety afforded by the vast expanse of Rogers Dry Lake, experimental aircraft routinely utilized the lake bed as their landing site. Shown here is the number 2 X-15 landing on the lake bed following a test flight in 1960.

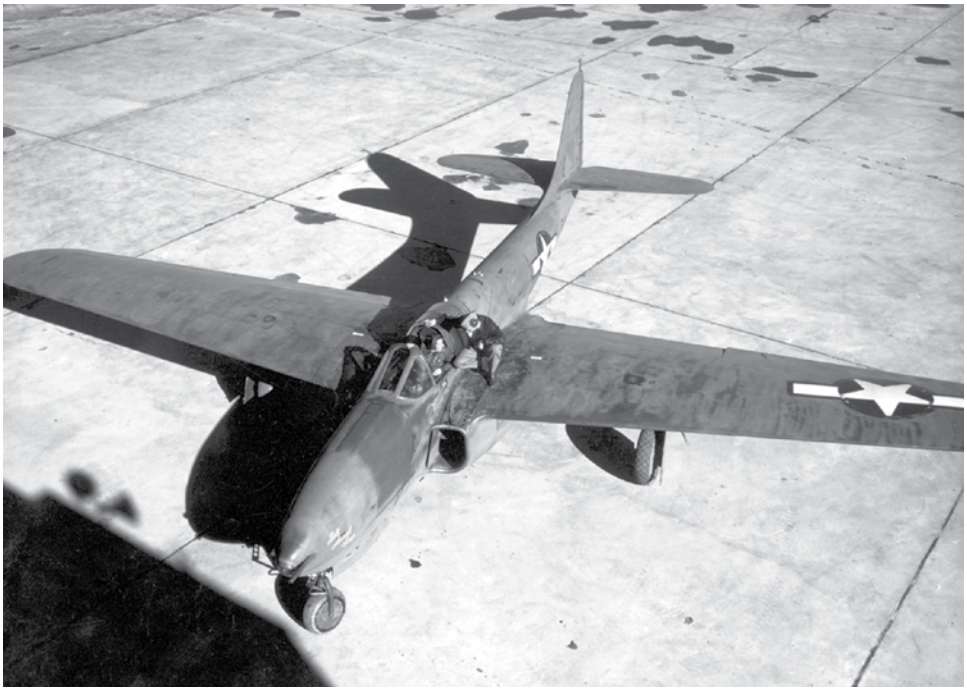
A B-1B from Dyess AFB, Texas, diverted to Edwards on 4 October 1989 when its landing gear failed to extend, skids across the lakebed as it lands safely on lakebed runway 33. Its crew of four walked away unscathed. The B-1 was repaired and, less than four months later on 24 January 1990, the same crew flew it back to Dyess.

Compass Rose, laid out on the lake bed surface in 1956, was initially used to calibrate the magnetic compasses on airplanes. The markings, however, are inaccurate by approximately 9 degrees and are no longer used for calibration purposes. It remains an easily identifiable landmark on the lakebed as shown in this photo of the F-22 flying overhead (2000).

NORTH BASE

In 1941, Lieutenant General Henry H. "Hap" Arnold designated this site as a location for the testing of special weapons (powered glide bombs, television-guided bombs, early missiles). The GM-1 *Bug*, for example, completed its first flight test there in November 1941. In April 1942, it was selected as the site for the flight testing of America's first turbojet-powered aircraft, the Bell XP-59A. As the XP-59A lifted off from the lake bed for the first time on 1 October 1942, it launched the turbojet revolution in America. A portable hangar (now designated Building 4305) had been erected to support this operation. That hangar along with a water tower and a wooden military barracks—three unimpressive structures—represented the humble beginnings of what would one day become the USAF Flight Test Center. Buildings 4401 and 4402 were erected during the following year and these and other facilities comprised what was called the Materiel Center Flight Test Base throughout the remainder of World War II. From 1942 to1954 (i.e. the XP-59A through the XF-104), these facilities supported the first flights—from the lake bed—and initial testing of virtually every fighter prototype considered for the USAF inventory as well as early jet bomber prototypes such as the XB-43, XB-45 and XB-46.





The XP-59A Airacomet, America's first jet aircraft (1943)

The XP-59A radio operations were carried out from the lake bed. Note the three facilities in the background—the only structures present at that time—the hangar, water tower and barracks.

The wooden barracks, affectionately known as the Desert Rat Hotel (1946).

By 1946, the North Base complex had greatly expanded.

The original XP-59A hangar, Building 4305, is still in use. Today, the hangar looks much as it did in this 1994 photo.

NORTH BASE SLED TRACK

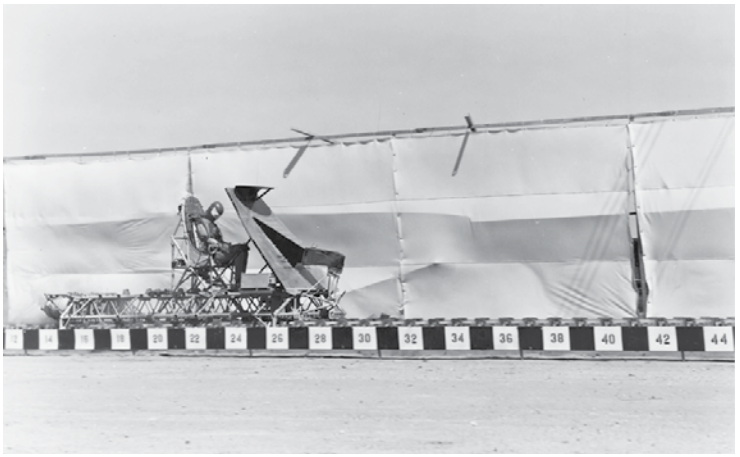
Originally constructed—but never used—by Northrop in 1944 to conduct launch tests of pulse-jet JB-10 cruise missiles (a program that grew out of technology transfer from the German V-1 "buzz bombs"), the 2,000-foot track was modified with a mechanical braking system in 1946 to support high-speed deceleration tests. The first such track in the United States, it supported test operations under the direction of aeromedical pioneer Dr. John Paul Stapp, between 1947 and 1953, during which anthropomorphic dummies and human volunteers were employed to study the effects of "g" forces on the human body and to develop and test restraining devices and safety equipment.

Up until the time these tests were conducted, conventional medical wisdom maintained that the human body could endure no more than about 17-18 g's. Stapp used himself as a test subject on 26 sled runs and, on 1 June 1951, he proved that, if properly restrained, the human body could survive a 48g deceleration.

Stapp—then a Major—strapped onto a rocket-propelled sled prior to one of his "rides." Accelerometers attached to his mouth piece, chest, and right knee transmitted signals during the test (circa 1951).

The rail bed, as shown here in 1995, is all that remains of the track.

Military officials observe as another human test subject is prepared for a test run. Note the four rockets which propelled the sled.



Anthropomorphic dummies were routinely employed on the deceleration track.

Northrop's Gee-Whizz deceleration sled speeds down the track during a test run. By using different numbers of brake shoes and rockets, sled speeds and the degree of deceleration force could be predetermined up to a maximum design limit of 50 g's.

JET PROPULSION LABORATORY COMPLEX

The A-20 test team at Muroc (from left): Martin Summerfield, Frank Malina, Walt Powell, Colonel Paul Dane, and Theodore von Karman (30 March 1942)

In 1942, Aerojet Corporation (created by Theodore von Karman and the predecessor of JPL) conducted the first rocket-assisted take-off tests of a U.S. military aircraft from the nearby lakebed using a modified A-20 piloted by Colonel Paul Dane. By 1944, Aerojet/JPL had established a permanent facility here where virtually all of the early U.S. Army rocket engines designed for missiles were static tested—from the mid 1940s through the mid 1950s. Ultimately, this laboratory supported the development of engines used for U.S. deep space probe operations—such as the *Viking* Mars lander in the 1970s. It developed, produced, and poured solid rocket propellant into castings for engines and later tested them. It also had a chamber to test engines in a vacuum. JPL shut down the facility in 1995.

A rocket engine undergoing test at the Edwards Test Station (1962).

An aerial view of JPL's Edwards Test Station (1960s)

The A-20 testbed aircraft lifts off from the lakebed using rocket-assisted take-off (1942).

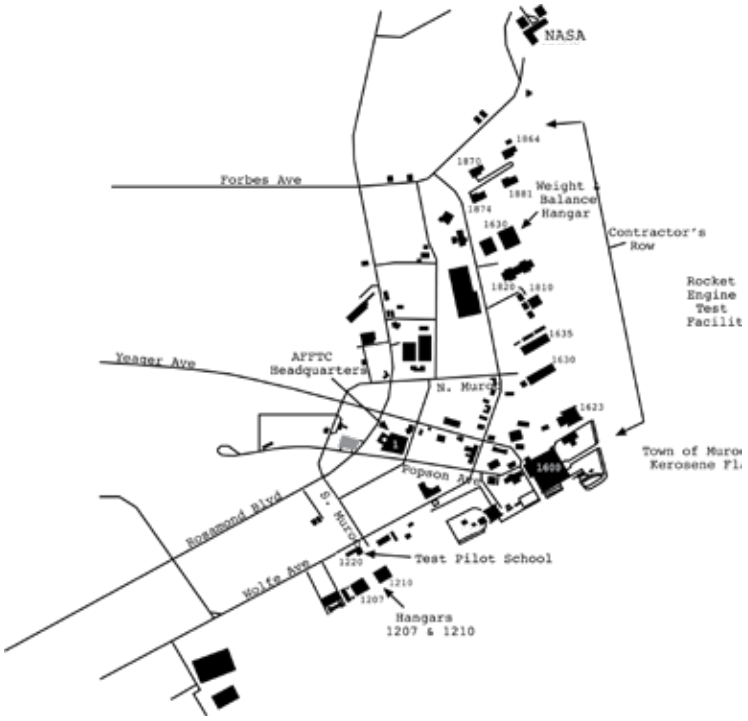
The 18th Space Surveillance Squadron commenced operations near the site on 2 February 2000.

MAIN BASE

NASA FLIGHT FACILITY

On 26 June 1954, the National Advisory Committee for Aeronautics (NACA) flight research organization left its outmoded South Base facility and moved into the new complex of buildings and hangars at the north end of the Edwards flight line. Completed at a cost of $3.8 million, the facility was originally designated the NACA High-Speed Flight Station. Four years later, NACA was reorganized as the National Aeronautics and Space Administration (NASA). Today the complex is known as the NASA Dryden Flight Research Center, where its mission of aerospace research continues.

The X-1E graces the entrance to NASA's Dryden facility. It was this view of NASA that television viewers saw weekly during the opening scenes of the 1960s comedy, "I Dream of Jeannie."



An aerial view of the newly constructed NACA High-Speed Flight Station (1954)

One of NASA's main hangars in 1966. Aircraft: (clockwise from top right) all three X-15s, HL-10, M2-F2, M2-F1, F-4A, F5D, F-104, R4D

An aerial view of the NASA Dryden Flight Research Center in 1997. Aircraft on display: (left) F-16, F-18, X-38, B-52 (middle) X-36, F-16 AFTI, T-34, King Air, F-18, F-16XL, F-16XL, F-106, X-31, F-15B, F-15 ACTIVE, SR-71, (right) 747

Space Shuttle Columbia, in April 1991, being mated to its carrier 747 aircraft in the Shuttle Mate-Demate Device.

CONTRACTOR'S ROW

It was near this location in January 1934 that the first squadrons from March Field, flying P-26 *Peashooters,* bivouacked when they deployed to Muroc for bombing and gunnery training. One of these squadrons—the 34th Pursuit Squadron—was commanded by then-Captain Ira Eaker. Facilities along this stretch of flight line, commonly referred to as "Contractor's Row," were constructed in the mid-1950s and have since supported an extraordinarily wide range of test programs.

The hangar complex at the north end of the flight line housed General Electric and Northrop's F-104, T-38, F-5/RF-5, YF-17, F-20 and McDonnell Aircraft Company's (later McDonnell Douglas) F-4 and RF-4, F-15, DC-9, AV-8, T-45 and (very briefly) F-18 test programs. Army flight test operations were conducted out of Building 1820 (1960-1996) and Building 1810 was utilized by the A-10 (1972-84), T-46 (1984-87), YF-22A/YF-23A (1989-1991) and F-15 (1994-present) programs. The 1600 series of hangars provided for the F-106, F-111 and F-16 programs. Building 1623, constructed in the late 1960s to support the C-5 program and subsequently used for the B-1A/B (1974-89) and C-17 (1990-96), is currently being used by Test Squadrons and contractors.

Boeing P-26 Peashooters over Rogers Dry Lake (mid-1930s)

Looking north from the control tower down "Contractor's Row" (April 2001).

An overview of the 95th Squadron camp during its deployment to Muroc (1934)

Lockheed's YF-12 Blackbird on public display (for the press and VIPs, near Building 1881) for the first time following President Lyndon Johnson's announcement of its existence (30 September 1964).

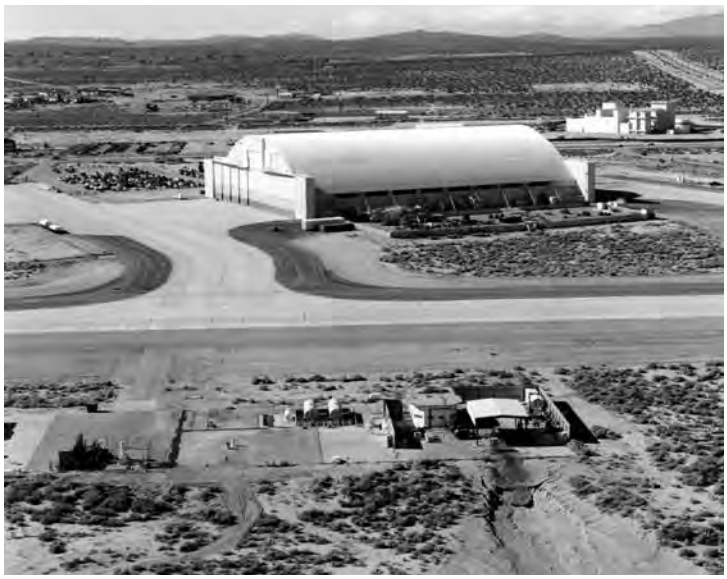
McDonnell's F-15 Eagles on the ramp during the early years of the test program (1973).

WEIGHT AND BALANCE HANGAR

Perhaps the most unique of the facilities along Contractor's Row is Building 1830, commonly referred to as the Weight and Balance Hangar. This 300 feet by 400 feet clear-span aircraft hangar is equipped with a large, flush-mounted floor-installed, calibrated scale system to determine an aircraft's gross weight as well as provide data to compute its center of gravity. This capability is available for nearly any size aircraft. The system comprises four tables—arranged in a cruciform pattern—each with a 300,000 pound capacity and capable of measuring in 20 pound increments. The center of gravity computation is performed on the largest of these platforms which provides for longitudinal leveling of aircraft via an electrically controlled vertical adjustment through a range of 69 inches.

Shuttle Enterprise on the scales.

The hangar's spacious interior is evident in this 1982 photo of a B-29, used in the filming of "The Right Stuff," next to a B-1A.



An aerial view of the hangar (December 2000)

The Shuttle Enterprise entering the hangar atop its carrier 747 aircraft (1977).

ROCKET ENGINE TEST FACILITY

Constructed to support the X-15 high speed flight research program, these static test stands permitted on-aircraft testing of the 57,000 pound thrust XLR-99 engine. On 17 June 1960, Scott Crossfield was sitting in the cockpit of the No. 3 X-15 when an engine malfunction resulted in an explosion which all but destroyed the aircraft. Though he had been subjected to a force of 50 g's, Crossfield was unhurt and he later related the following story: *When the reporters asked me how I felt, I said 'I'm fine; just spoiled the crease in my pants.' Next day, one of the headlines read: 'X-15 Explodes; Pilot Wets Pants*.' The test stands subsequently were used to test the rocket engines used in the X-24 and NF-104 aircraft during the 1960s and 1970s.

Aftermath of the X-15 engine explosion (17 June 1960)

Static testing of the X-15's XLR-99 engine (August 1963)

Rocket Engine Test Facility (circa 1961)

Once the scene of intense activity, the test stands have stood silent for the past quarter-century (April 2001).

TOWN OF MUROC

Muroc General Store and Post Office (circa 1920)

In 1910, Clifford and Effie Corum, their two children, and Clifford's brother Ralph settled on a site at the edge of what was then called Rodriguez Dry Lake (just east of where the control tower now stands). In addition to raising alfalfa and turkeys, the enterprising Corums located other homesteaders in the area for a fee of $1 per acre, then secured contracts for drilling their water wells and clearing their land. The Corum family also opened a general store and post office. Their request to have the post office named Corum was denied because there was already a Coram, California. Thus, they simply reversed the spelling of their name and came up with Muroc. In 1912, the Corums donated their store to the county to serve as the community's first schoolhouse. The school opened in 1914 with Miss Ruth Miriam presiding over a class of ten students in the tiny one-room structure. The Muroc settlement was the focal point for community activities throughout the area until the Air Force expanded the base and took over the real estate in the early 1950s.

Muroc Train Station (circa 1940)

The Corum family in front of a water-drilling rig (circa 1915)

The general store continued in business—shown in this 1940s photo under the ownership of Charlie Anderson—through the early 1950s.

Muroc Schoolhouse (circa 1920)

KEROSENE FLATS

Kerosene Flats was the nickname given to the housing area for married personnel from World War II until 1954. A cluster of wooden duplexes was built adjacent to the settlement of Muroc (just east of where the control tower now stands), a whistle-stop alongside the Atchison, Topeka and Santa Fe railroad tracks that bisected the lake bed until 1953. The wives who lived there spoke feelingly about the wind and dust that penetrated the thin wooden walls, and the penetrating smell of the kerosene used for their heaters. No one protested when the temporary wartime housing was torn down. The town of Muroc itself disappeared at the same time when the railroad tracks were shifted several miles to the north and the new Edwards flight line engulfed the area.

Kerosene Flats (mid-1940s)

An aerial view of the Kerosene Flats complex

AIR FORCE FLIGHT TEST CENTER HEADQUARTERS

The flag was raised above the new AFFTC Headquarters on 18 August 1955, marking the final move of the Flight Test Center away from the hastily-built South Base complex that had served during the World War II and post-war years. It was austere in form, but adequate to serve the expanding needs of the AFFTC as it developed into the nation's premier flight test center.

Raising the flag above the new AFFTC Headquarters (1955).

AFFTC Headquarters (1955)

AFFTC Headquarters (2001)

USAF TEST PILOT SCHOOL

When the Air Force Test Pilot School was moved from Wright-Patterson Air Force Base in Ohio to the high desert in 1951, its instructors and students occupied an old wooden hangar on the South Base flight line. Not long after they arrived, a large construction program got underway a couple of miles to the north, where permanent buildings were rising in the new Main Base area.

In March 1956, the Test Pilot School moved into its specially-constructed classroom facilities alongside Wolfe Avenue. For the first time, its offices, classrooms, flight line, and maintenance facilities were co-located in one area and the school could operate at peak efficiency. Over the years, the TPS facilities were improved and a new portico softened the building's stark appearance. In the meantime, the temporary wartime buildings at South Base were torn down.

Soon after moving to Edwards in 1951, three students of the Experimental Test Pilot School prepare for a flight.

The school's first home at Edwards was an old wooden maintenance hangar (1953).

Arriving in 1953, the T-33 would become the school's workhorse airplane. Other curriculum aircraft, shown here behind the T-33, were the B-25, F-84, and T-28.

The only structure ever designed specifically for the purposes of the USAF Test Pilot School, the newly constructed facilities along Wolfe Avenue were occupied in 1956.

The USAF Test Pilot School in 1998. From 1968 thru 1971, the highly modified, rocket-boosted NF-104 permitted students to zoom to altitudes well above 100,000 feet. The aircraft, along with a T-33, is now on static display at the school.

HANGARS 1207 AND 1210

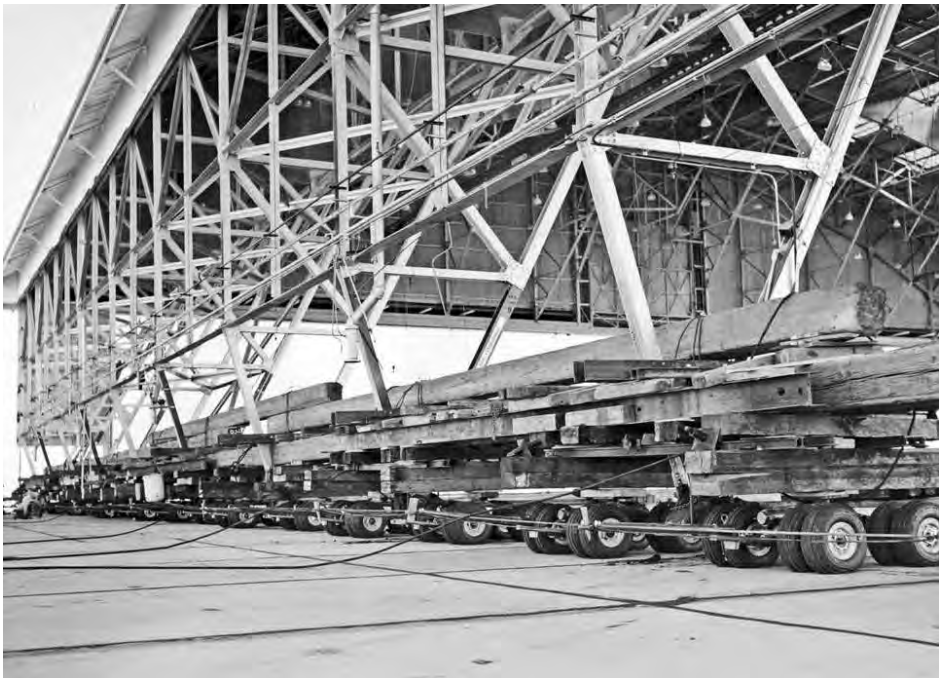
As World War II reached high gear in 1943, two mammoth hangars were constructed on the flight line at Muroc Army Air Field. Sitting side by side, each one measured 250 feet by 283 feet and contained more than 1,400 tons of steel; together, they cost $3.5 million. After the war, they were used for the X-1 project. New bomber programs such as the XB-45 *Tornado*, the XB-35, and YB-49 *Flying Wings*, and the XB-47 *Stratojet*.

When Main Base was constructed in the early to mid-1950's, many of the facilities at the old field (now called South Base) were demolished. Hangars, however, were needed along the ramp of the newly constructed Main Base and it came down to a question of tearing down two of the hangars at South Base and building new ones on Main Base, at a cost of more than $4 million, or attempting to move them a distance of two miles to the new flight line. An engineering feat of this magnitude had never been attempted before.

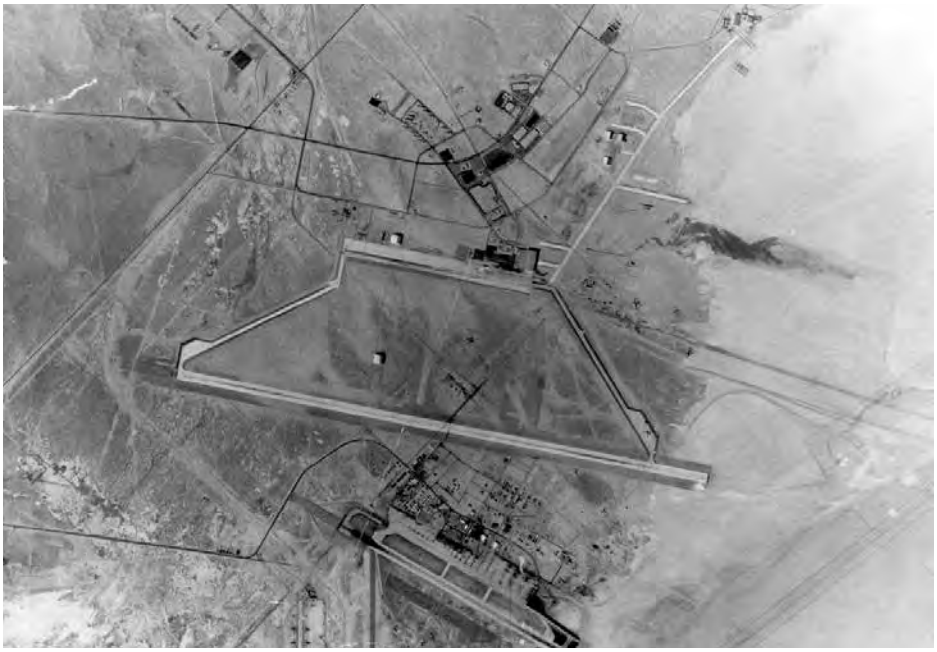
The job was contracted out, and eventually more than $1.5 million was spent. Besides their massive weight, great care had to be taken to keep the immense hollow structures from spreading at the base during the move. Over a period of five weeks in 1955, each was jacked up with up to fifty 50-ton jacks, braced with timber cribbing, and set atop 54 rubber-tired dollies. Two 300-horsepower logging winches towed them across the desert floor at a rate of one-twelfth of a mile per hour. Although the contractor eventually went bankrupt, the project was a great bargain for the Air Force. Now designated Buildings 1207 and 1210, the great hangars have been used for numerous purposes in the ensuing decades.

The massive hangars at their original location, along the ramp at South Base (1947)

The hangars were set atop rubber-tired dollies to accommodate their move across the flight line in November 1955.



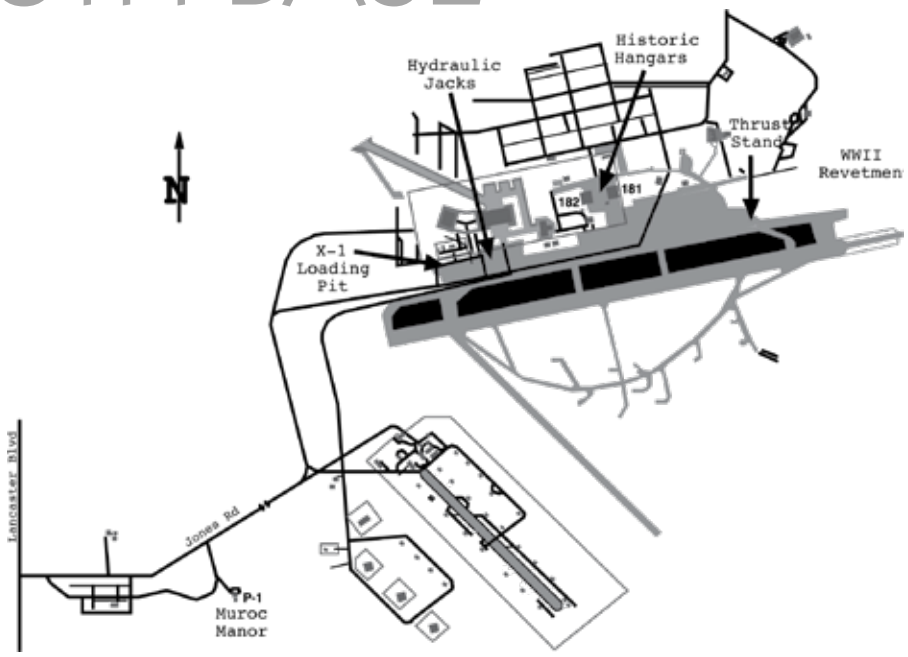
A close-up view of the jacks, braced with timber cribbings.



Logging winches were used to tow the hangars across the desert floor to their new home in the Main Base area.

Now designated Buildings 1207 and 1210, the hangars grace the west end of the Main Base ramp (April 2001).

SOUTH BASE



THE 1940s "NEW" BASE

The military had settled on the east shore of the lakebed when they established the bombing and gunnery ranges in the early 1930s. By the early 1940s, work was underway on a new, permanent facility on the west shore of the lakebed (what is now called South Base). The coming of the war accelerated the construction of the new base and structures such as the hospital and headquarters—"marvels of tarpaper, wire and wood"—were erected in short order. On 23 July 1942, Muroc Army Air Base was designated as a separate post, its mission to train fighter and bomber personnel just prior to overseas deployment. It later became the hub of flight test operations.

A P-80, B-25, and T-28—Test Pilot School curriculum aircraft—fly over the flight test operations building (early 1950s).

The very modest, but practical, hospital facility (1945)

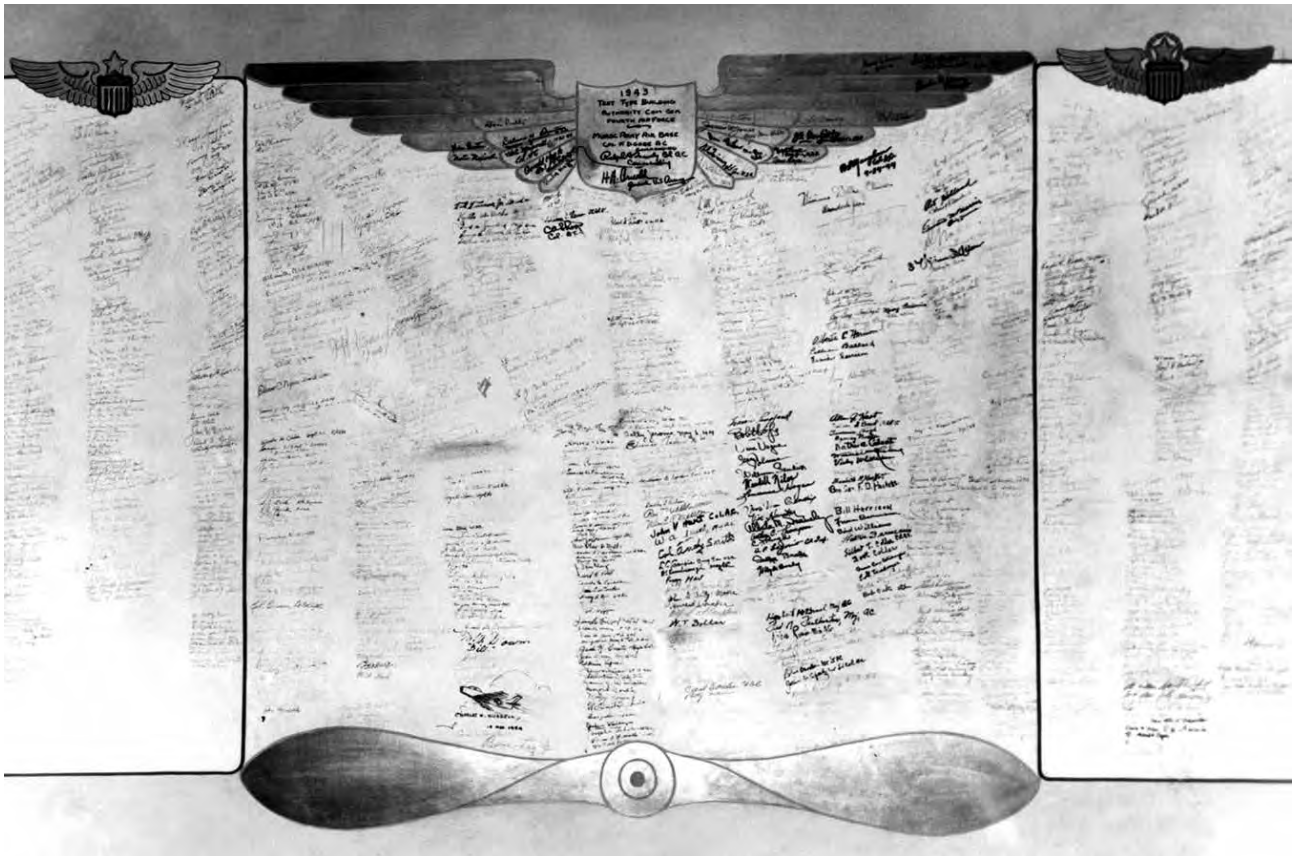
Plenty of activity occurred on the ramp area as shown in this 1954 photo.

By the mid-1940's, the vast complex had become the hub of flight test operations. Note the XB-35 Flying Wing parked in front of the hangar and the X-1 loading pit barely visible in the left corner of the ramp. At the extreme top left is the town of Muroc. The two hangars near the center of this photo were moved to Main Base in 1955 and designated Buildings 1207 and 1210 (1946).

An entirely new complex was constructed at South Base in the mid-1980's to support the B-2 test program. Named the Birk Flight Test Facility on 7 September 1994 in memory of Colonel Frank T. Birk, USAF (Retired), the facility now supports the Flight Test Center's bomber and unmanned aerial vehicle programs.

MUROC MANOR

Largely built from adobe, Building P-1 was completed in late 1942 and served as the installation commander's residence until 1957. Distinguished visitors, such as Generals Hap Arnold, Carl Spaatz, Hoyt Vandenberg, and Jimmy Doolittle, famed aviatrix Jackie Cochran, Hollywood personalities Bob Hope, Edward G. Robinson, Jimmy Durante, William Bendix, William Holden, and Lloyd Nolan, were entertained here. Many of them autographed a wall in the game/billiard room in the basement which, unfortunately, was covered over by a painter in the mid-60s. Cork trees just to the east of the house were a gift from the King of Spain to Brig Gen Albert Boyd, AFFTC Commander, in 1950. Named Muroc Manor in the mid-1980s, it was occupied by the Civil Air Patrol for many years before it was demolished in late 2013.



Autographed wall in the game room

Commander's Residence (circa 1955)

Muroc Manor (2000)

X-1 LOADING PIT

The number 2 X-1 in the propellant servicing area adjacent to the loading pit (December 1946).

One of the problems associated with the supersonic X-1 research project was the matter of loading the bullet-shaped rocket plane into the launching bay of its mother ship. Even with its bomb bay doors removed, the modified B-29 sat too close to the ground to permit loading. A relatively simple solution proved to work very well. Early in 1946, Muroc Air Force Base engineers constructed a small, cruciform pit near the western end of the ramp that just fit the X-1. It was then an easy matter to roll the small rocket plane down into the pit, tow the B-29 over it, and then hoist the X-1 up into the bay. Once secured by a bomb shackle, the X-1's water-alcohol and liquid oxygen tanks were topped off from propellant tanks located adjacent to the pit.

The numbers 1 (foreground) and 2 (loading pit) X-1s with the B-29 launch aircraft on the ramp (June 1947).

The B-29 taxiing with the X-1 loaded in its bomb bay. Note the extremely narrow space—less than one foot—between the ramp and the X-1's ventral surface.

The pit remains part of the ramp, which is now a parking lot for the Birk Flight Test Facility. Shown here in 2001, it looks much as it did more than 50 years earlier.

HYDRAULIC JACKS

Low ground clearance of the launch aircraft continued to be a problem with the next generation of rocket planes. The B-29 and B-50 mother ships which carried the planes to their launch altitudes sat too close to the ground to make loading possible. The X-1's loading pit was too small and the wrong shape for the next generation of research planes. The solution was to use flush-mounted hydraulic jacks to raise the carrier aircraft high enough to roll the rocket plane under the launching bay. This method worked, but the bomber always appeared to be unsteady and sometimes it rocked precariously in the wind. One B-50 pilot joked that the most dangerous part of any launch flight occurred when the bomber was hoisted off the ramp. It was finally decided never to attempt it when the winds were higher than 5 mph.

The Bell X-2 being mated to its B-50 mother ship, elevated by hydraulic jacks (mid-1950s).

Today, the area is used as a parking lot. All that can be seen of the hydraulic system is three flush mounted steel plates beneath the rows of automobiles.

SOUTH BASE HISTORIC HANGARS

Two wooden-and-corrugated-metal hangars (Buildings 181 and 182) at South Base are among the oldest structures at Edwards. Building 181 was built in 1942, originally to support the Army Air Force's training mission during the wartime emergency. From the mid-40s to the mid-50s, the hangar facility was used to support contractor (principally Douglas) flight test operations. Building 182 was occupied, through 1954, by the National Advisory Committee for Aeronautics (NACA) High-Speed Flight Station, and served as home to a whole stable of exotic flight research airplanes. More recently, in May and June 1982, several scenes for the motion picture *The Right Stuff* were shot in and around Building 181.

Aircraft of the NACA High-Speed Flight Station, 1953: (clockwise from rear) XF-92A; X-5; X-1; X-4; D-558-I Skystreak; D-558-II Skyrocket.

The two hangars sit nearly vacant, used only occasionally for storage. The ramp area in front of the hangars now accommodates AFFTC Museum aircraft awaiting restoration (December 2000).

THRUST TEST FACILITY

Testing the thrust produced by an aircraft's engine was critical to the development of that aircraft. Testing thrust while airborne was not possible, so engineers would measure the aircraft's thrust while it was on the ground, then adjust the data for humidity, altitude and temperature to predict the aircraft's performance at various altitudes. From 1948 through the late 1950s, this testing was conducted at the Thrust Test Facility located near the east edge of the South Base ramp (a newer thrust stand was constructed adjacent to today's Weight and Balance Hangar and thrust testing activities moved to that facility in the late 1950s). The cruciform shaped pit allowed for the testing of various sized aircraft—the nose-wheel would fit easily into the forward part of the pit while steel plates on the sides of the pit could be arranged to accommodate the width of the aircraft's landing gear.

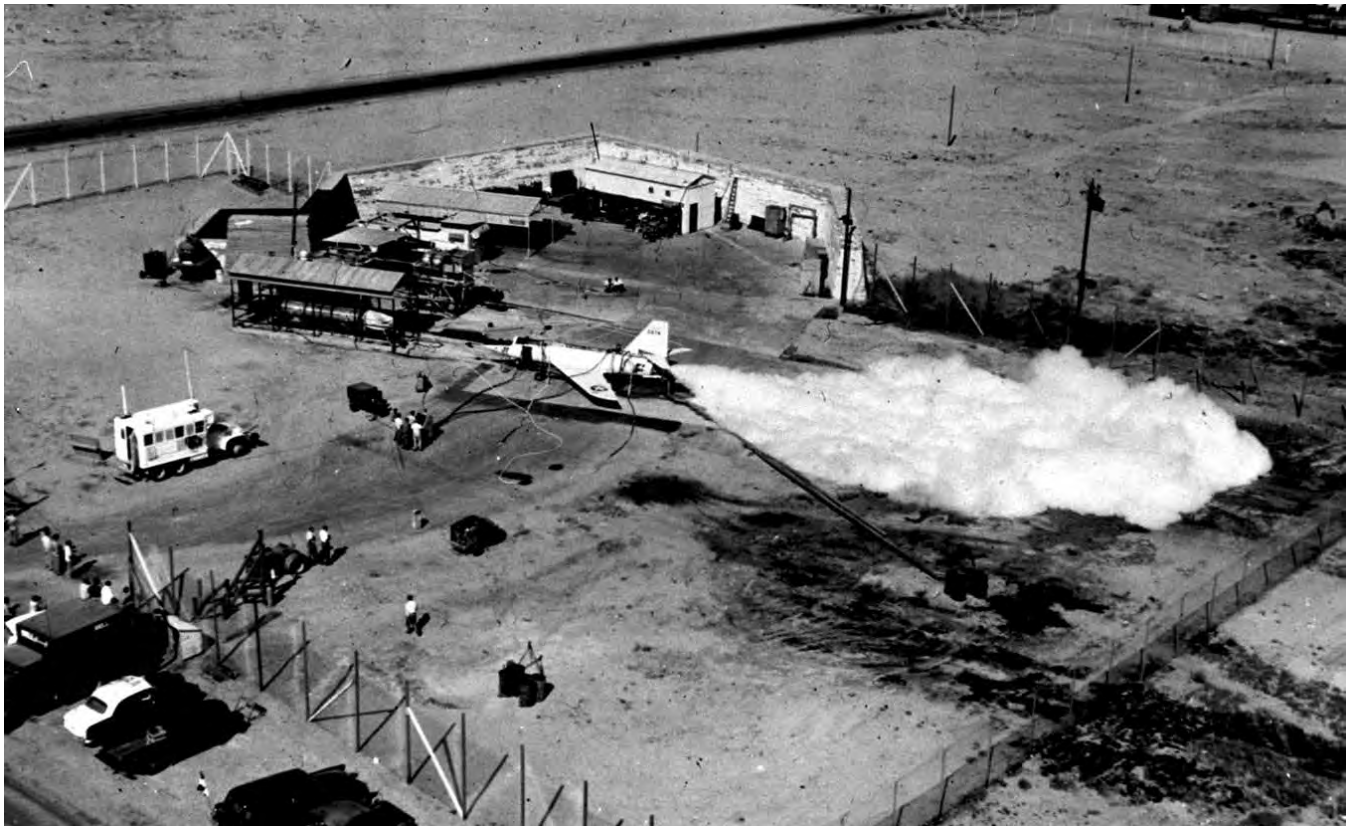
The XF-90 undergoing thrust testing at the Thrust Test Facility (October 1949).

The Thrust Test Facility as it looked in April 2001.
A few steel plates remain although most of the pit has been filled with dirt.

WWII REVETMENT: XLR-11 ROCKET ENGINE TEST AREA

A number of large aircraft revetments are quietly weathering away along the western shore of Rogers Dry Lake in the South Base area. During World War II, Army engineers built them out of adobe from the lake bed in order to study construction techniques that could be used to protect aircraft based on the Pacific islands. Easy and cheap to build, the revetments made effective shields against weather and enemy attack. The revetments were used throughout the war to park the bombers flown by aircrews to complete their final stateside training.

After the war, propulsion engineers discovered that the abandoned shelters also made efficient wind shelters and sound barriers. Their remote locations made them ideal for housing the first rocket engine test facilities. The blockhouse and test stand of the X-1's rocket motor, the XLR-11, fit easily into the area designed to accommodate a B-29.



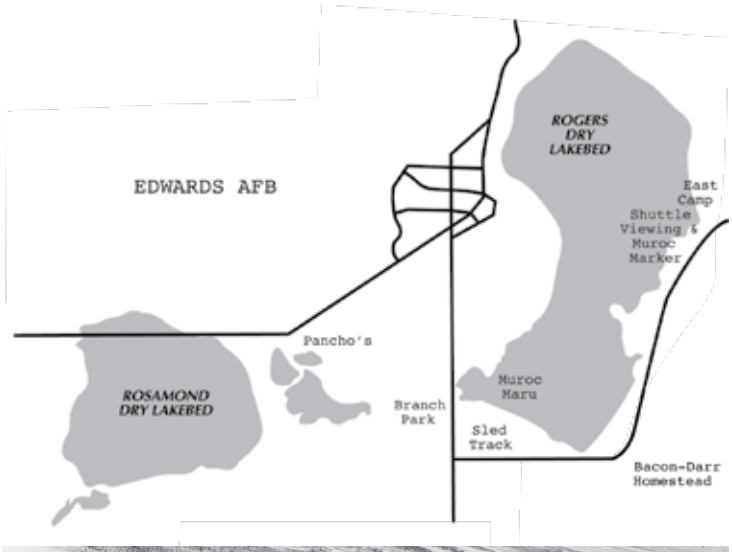
The Bell X-2 in the revetment during rocket engine testing (early 1950s).

Nearly sixty years after it was built, much of the original structure still stands (April 2001).

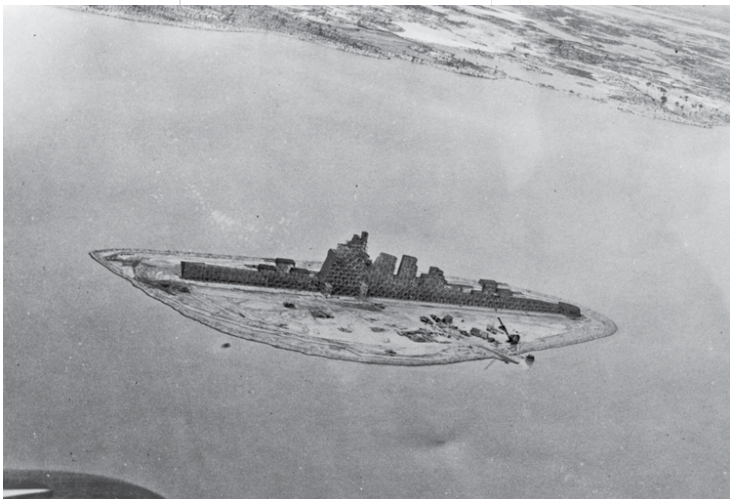
During the war years, church services were sometimes held in the revetment (1943).

OUTLYING AREAS

MUROC MARU

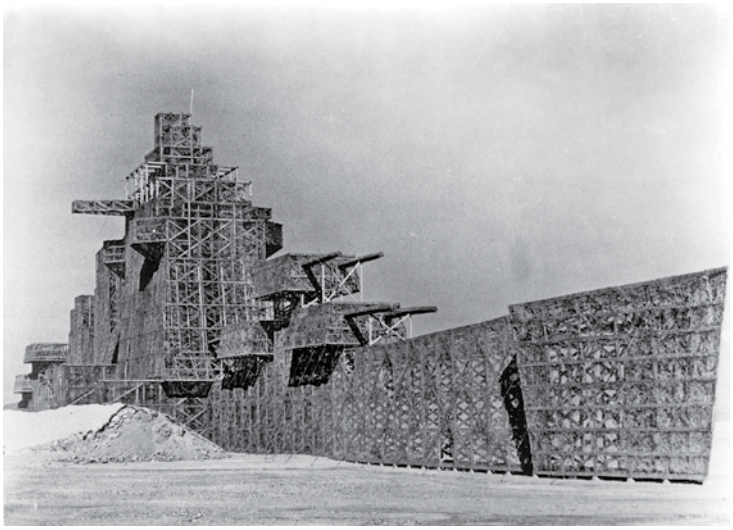


In order to prepare bomber crews for combat in the Pacific Theater during World War II, Army Air Forces engineers constructed a full-sized replica of an enemy warship in a cove at the south end of the Rogers Dry Lake. The giant training aid was built of 4-by-4 timbers covered with chicken wire and flocked with chopped chicken feathers. Often erroneously called a battleship, it was in reality a surprisingly realistic silhouette of an Atago-class heavy cruiser of the Imperial Japanese Navy. Bulldozers raised long earth berms along the sides of the ship to simulate wake and wave action. Nicknamed the *Muroc Maru*, it was used for bombing and strafing practice and for recognition training. Surprised visitors were often told, tongue-in-cheek, that the target vessel was only a desert mirage. Today, stories and memories are all that remain of the imposing training aid. After the war, the *Muroc Maru* was deemed a safety hazard—and it was dismantled in 1950.



A crane, bulldozers and dump trucks working on the berms that simulated wave action.

A B-25 flying over the Muroc Maru, a training aid for bombing and strafing practice during World War II.



Up close, it couldn't be mistaken for anything other than what it was—a crude structure of timbers and chicken wire. From a distance, however, passersby couldn't believe their eyes when they saw what appeared to be a warship floating on a dry lake bed in the middle of the desert.

Little more than a trace remains of the Muroc Maru.

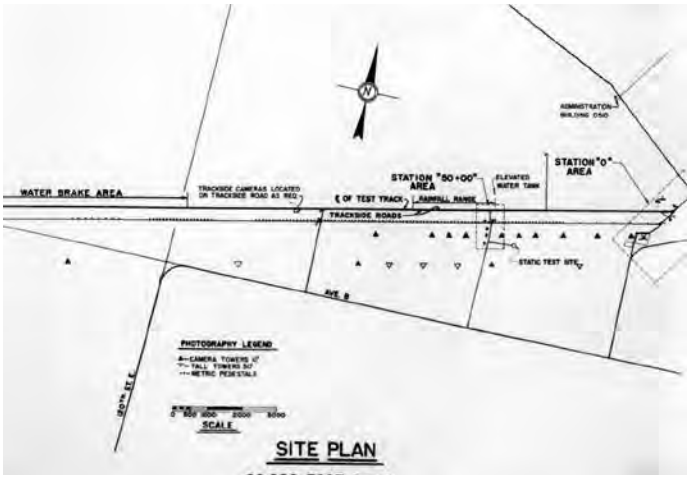
EXPERIMENTAL HIGH-SPEED TRACK

Frequently called an outdoor wind tunnel, the Experimental High Speed Track was built in 1948 to test aerodynamic shapes at transonic speeds. Originally 10,000 feet in length, the track was doubled to 20,000 feet in 1957, allowing rocket sleds to achieve speeds approaching Mach 4. Over the years, the facility was used to test a wide range of items, among them: rocket engines, the aerodynamic efficiency of aircraft and missile shapes, supersonic ejection systems, and the structural integrity of airframe components. Tail sections, for example, could be mounted on a rocket sled and tested for aerodynamic flutter. Banks of water nozzles allowed nose sections to be evaluated for rain erosion during high-speed flight.

The construction of a more versatile facility at Holloman Air Force Base in New Mexico marked the end of the track's usefulness, and it was deactivated in 1963. A water tower overlooking the south end of Rogers Dry Lake, some abandoned buildings and the remains of a blockhouse are all that are left of what was once the nation's foremost high speed research track. Most of the visitors who enter Edwards Air Force Base through the South Gate on Lancaster Boulevard are unaware that they are driving across the old track.

A Cook Research sled entering the water break on the original 10,000-foot track.

A Northrop T-38 sled during testing of the supersonic trainer's ejection system.



Site plan of the 20,000 foot track

The remains of the track (December 1998)

The forward section of a Convair F-106B during a test run.

BRANCH MEMORIAL PARK

Branch Memorial Park was dedicated 24 May 1968, in honor of Major General Irving Lewis "Twig" Branch, AFFTC Commander, who was killed when his T-38 crashed into Puget Sound, Washington, 3 January 1966. General Branch had served as commander of the AFFTC since 29 July 1961. Construction of this "oasis in the desert" was made possible by donations by Edwards AFB personnel, as well as contributions from individuals and businesses throughout the Antelope Valley.

Major General Irving L. Branch,
1 August 1912 - 3 January 1966

An aerial view of the newly constructed park (1968)

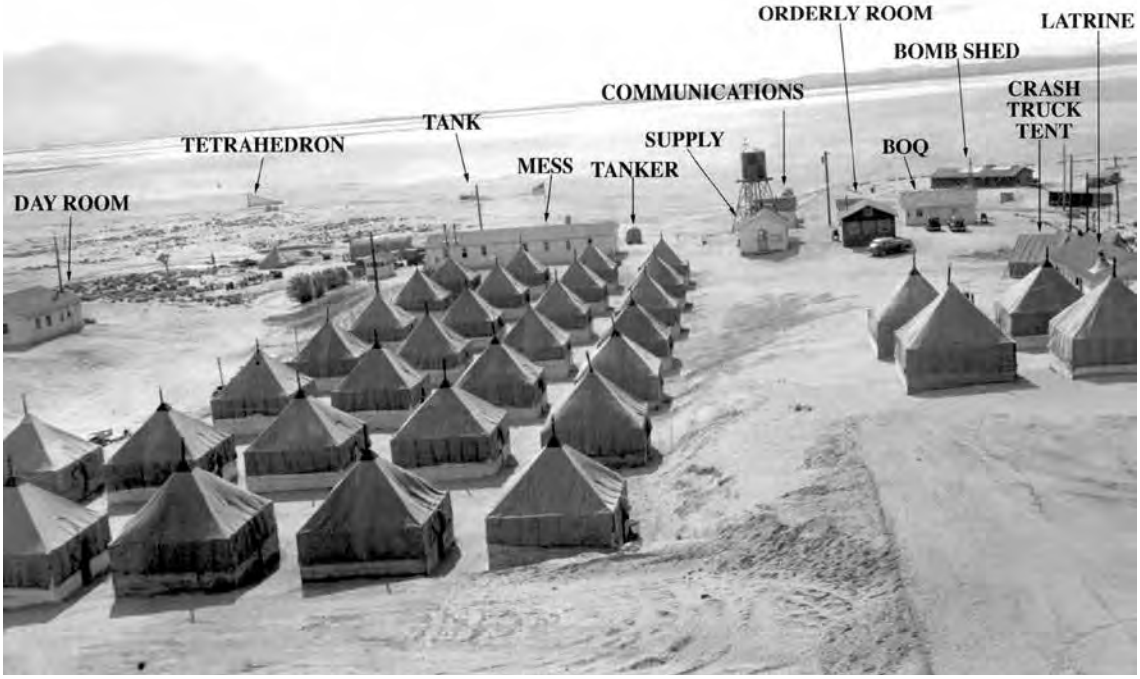
Dedication of Branch Memorial Park (24 May 1968)

Branch Memorial Park (April 2001)

EAST CAMP

Edwards Air Force Base began as a remote bombing and gunnery range for nearby March Field. Starting in 1934, a small cadre of hardy enlisted men and non-commissioned officers permanently occupied part of the eastern shore of Rogers Dry Lake. They comprised the Muroc Bombing and Gunnery Range Detachment and their job throughout the remainder of the 1930s was to set up and maintain a series of ground targets, and to score the performance of bombers and fighters that used the range. Visiting Army Air Corps squadrons would land on the lake bed and live in tents during a week or so of exercises. The location became known as East Camp in the early 1940s when the new base was being built across the lake bed and the troops stationed there continued to service the bombing and gunnery range along the lakebed's east shore. East Camp was abandoned at the conclusion of WW II.

This part of the base is seldom visited now, and there is little to remind one of those early days. The concrete foundation of the mess hall overlooks a landscape that has been changed by erosion. The base of a tetrahedron that once served as a wind indicator still stands offshore (near what later became the Space Shuttle landing public viewing area), but the canvas tents are long gone.



East Camp—home of the Range Maintenance Detachment during the 1930s. The area near the tetrahedron was later used during the 1980s as a public viewing area for Space Shuttle landings.

Concrete bombs were made locally during the mid-to-late 1930s.

The Army Air Forces held massive wargames at Muroc in May 1937. Here, Northrop A-17A's simulate a "gas" attack.

Conditions were austere. In this photo, troops were stuffing their own mattress (1930s).

Few constructed facilities existed at the camp in the 1930s. The most common source of shelter were tents, used here to accommodate the camp's make-shift canteen (1930s).

Visiting aircraft, like this B-12 bomber in 1936, were serviced on the lakebed.

Tents and aircraft of the 1st Wing during maneuvers at Muroc (1935).

SPACE SHUTTLE LANDING PUBLIC VIEWING SITE

At 10:20:57 on the morning of 14 April 1981, Edwards AFB once again became the scene of high drama as the Space Shuttle *Columbia* touched down on historic Rogers Dry Lake. Astronauts John Young and Robert Crippen had just successfully landed the first orbiting vehicle ever to leave the earth under rocket power and return on the wings of an aircraft, and a new era in space exploration—the era of reusable space vehicle—had dawned. It seemed only fitting that the shuttles should make their first landings at Edwards where so many major milestones in flight had been accomplished and where so many of the shuttle antecedents had proven the concepts that had made it possible.

People from throughout the country would drive to Edwards to witness the landing of a space shuttle and, thus, a special viewing area was set-up on the east shore of the lakebed to handle the enormous crowds. The popularity of viewing a shuttle landing continued throughout the 1980s, as shown in these photos taken 3 October 1988, when the Space Shuttle *Discovery* returned to earth.

Thousands of people lined the east shore of the lakebed to view Discovery's landing. This was the first landing of a Space Shuttle since the tragic Challenger incident in January 1986.

Space Shuttle Discovery just prior to landing on the lakebed (3 October 1988).

MUROC MARKER

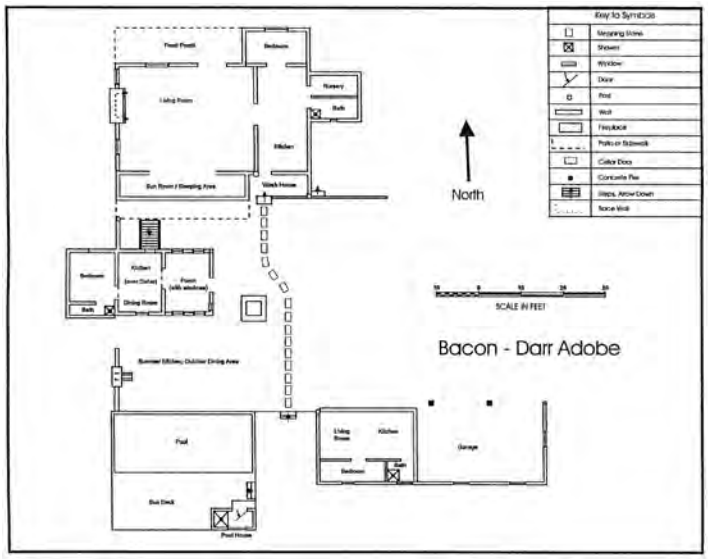
Immediately to the south of the Space Shuttle Landing Public Viewing Site are the faint remains of the Muroc Marker. In the 1930s, when the area was used as a bombing and gunnery range, letters approximately 80 feet in height surrounded by a circle approximately 300 feet in diameter identified the airfield for visiting aircrew.

The Muroc Marker identified the landing field for visiting aircrew (1937).

Nearly gone, the marker is difficult to find, even for those individuals who know its location (December 2000).

LANSFORD AND BACON-DARR HOMESTEAD

John and Glenna Lansford settled at this site in 1921 and built their first house—a two-room frame structure—and cleared 22-acres of land for their barley crop. Later, they built an adobe brick house using clay from Rogers Dry Lake. In 1938, Glenna's sister, Florence Bacon, and her husband leased 11 acres of the Lansford's 160-acre homestead and built an adobe house of their own. This home eventually included a garage, garage apartment, concrete swimming pool, and numerous outbuildings. When Charles and Jeanette Darr purchased the Bacon property in 1942, it became known as the "Darr Hacienda." The Darrs had other people living on the property and, at times, they would rent the main house and live in the garage apartment. In January 1954, the government took over the property in preparation for an expansion of Edwards AFB. According to Brigadier General Chuck Yeager, the Air Force housed military and civilian personnel at the Bacon-Darr Adobe and other houses in the area prior to the completion of on-base housing.



Floor plan for the Bacon-Darr Adobe

The Bacon-Darr Adobe (June 1953)

Darr family members enjoy a summer afternoon on the sun deck, overlooking the pool.

Ruins of the Bacon-Darr Adobe (February 2000)

PANCHO'S

Pancho Barnes' Rancho Oro Verde—commonly known as the Happy Bottom Riding Club—began as an alfalfa farm which the famous aviatrix purchased in the Antelope Valley in March 1935. Before long, she added horses, pigs and dairy cows to her stable and worked an arrangement to sell fresh pork and milk to the military stationed at nearby Muroc. In the 1940s, she added a roadhouse restaurant and bar for the pilots and officers of the growing air base. Within a few years, her establishment grew into a 368-acre dude ranch and included a horse corral and barns, dance hall, motel and swimming pool, and an airstrip equipped with a tower and hangars.

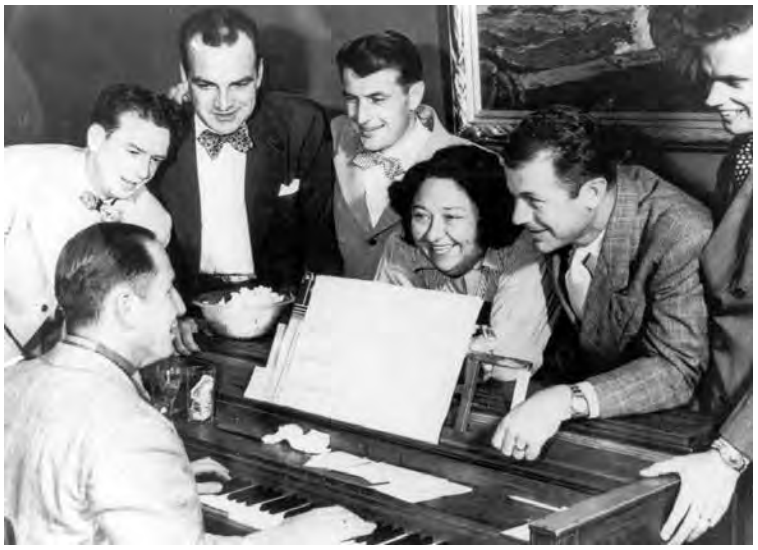
In 1954, the ranch was taken over by the government as part of a massive expansion of Edwards AFB. Pancho moved to Cantil, and later to Boron where she died in 1975 at the age of 74.

An avid pilot, Pancho routinely worked the bar where she swapped stories and jokes with her fellow pilots.

The motel's courtyard featured a stone fountain in the shape of the Army Air Forces' Stars & Bars logo.

The Fly-Inn Motel was a U-shaped structure with 20 air conditioned units.

Dancing was a common form of entertainment at the club.



Many leading test pilots enjoyed the activities at Panchos. Clockwise, from bottom left: Gust Askounis, Jack Ridley, Ike Northrop, Pete Everest, Pancho, Chuck Yeager, and Bud Anderson.

A 1940s aerial view of Rancho Oro Verde

A Spring of 2000 aerial view of the ruins