Birthplace of America's Missile and Space Activity

White Sands Missile Range is the largest overland military test range in the United States, occupying some 3,200 square miles of southern New Mexico. With more than 60 years experience in rocket and weapons system test and development, it has earned the title "Birthplace of America's Missile and Space Activity."

First known as White Sands Proving Ground (renamed White Sands Missile Range in 1958), this installation was established on July 9, 1945, as the place to test rocket technology emerging from World War II.

A launch complex, now known as Launch Complex 33, was built in the desert sand dunes six miles east of the post. It featured a concrete blockhouse with 10-foot-thick walls and a 27-foot-thick roof. A WAC Corporal launch tower was also erected. A year later, a gantry was added.

WAC Corporal

The first rockets to blast off from the launch complex, the nation's first large-scale launch facility, were WAC Corporals. Built by the fledging Jet Propulsion Laboratory, the 16-foot, 660-pound rockets were designed to carry a 25-pound weather package to an altitude of 20 miles.

Since the WAC Corporal was under-powered, JPL engineers used a solid-fueled rocket booster dubbed "Tiny Tim" to get the rocket out of its launch tower and up to speed. The booster generated 50,000 pounds of thrust for a half second. By the time the WAC Corporal was out of the 100-foot tower it was going almost 275 mph.

During a series of tests in 1945 and 1946, the WAC Corporal was very successful, ultimately attaining an altitude of 43 miles.

V-2 Takes Main Stage

However, the German V-2 was destined to become the main show. When the parts and pieces arrived in New Mexico aboard 300 train cars, the U.S. suddenly had the capability to launch payloads approaching 2,000 pounds to altitudes exceeding 100 miles.

General Electric was given the Hermes program to assemble and launch V-2 rockets at White Sands. German scientists led, by Dr. Werhner von Braun, were assigned to Fort Bliss, Texas, just 50 miles down the road from White Sands. These German scientists and engineers assisted GE, teaching GE's people how to assemble, handle and launch the big V-2s.

The V-2 stood 46 feet tall with a diameter of just over five feet. The gross weight at launch was about 28,000 pounds.

The first firing of a V-2 engine at White Sands took place on March 15, 1946 at the 100,000 pound thrust static test stand just a mile south of the main post.

The first full-fledged V-2 launched in April 1946 rose to an altitude of only 3.5 miles and crashed in a huge fireball. Then the Army and White Sands Proving Ground did something unusual by today's standards. They invited VIPs and the news media to watch the next launch.

With mayors, military leaders, photographers and reporters watching, the second V-2 launch on May 10, 1946, flew as advertised. The rocket climbed straight up then pitched to the north. It reached an altitude of 71 miles and impacted about 35 miles uprange.

It marked the first successful launch of a large rocket on American soil and accelerated the United States into the Space Age. Appropriately, *Life Magazine* ran a five-page photo spread of the mission.

Scientific Research Directive

In addition to improving rocket technology, the military had the foresight to direct that all V-2s carry some sort of scientific payload. The "V-2 Upper-Atmosphere Research Panel" was created to take proposals for experiments and decide which agency would use each rocket.

So on July 9 and 19, 1946, V-2s carried corn seeds and fruit flies aloft to expose them to cosmic radiation. Other studies included solar spectroscopy, solar radiation, artificial meteorites, temperatures, ambient pressures, winds and the composition of the atmosphere itself at various altitudes.

On October 24, 1946, motion picture footage taken from a V-2 captured 40,000 square miles of Earth's surface. On March 7, 1947, a Naval Research Laboratory team led by John Mengel put a camera aboard a V-2 that achieved a 100-mile altitude to bring back the first "space" photos of Earth.

The most important experiments might have been the Albert series of monkey launches. In 1948 and 1949 monkeys were placed into the payload compartment and instrumented to measure their heart and respiration rates. Luckily this data was telemetered to the ground for recording because the parachutes failed miserably and the monkeys died on impact. However, both measurements were within normal ranges during the acceleration forces at liftoff and the weightlessness experienced at flight apogee. It gave scientists confidence that a large mammal like a man would some day be able to safely ride a rocket.

The first two rockets ever fired at White Sands were married together to form the Bumper vehicle. The V-2 acted as a booster with the WAC Corporal mounted on top as the second stage. It was the world's first large-scale, two-stage vehicle. While the first Bumper firing was May 13, 1948 it was the February 24, 1949, launch that caught the public's attention. That WAC Corporal reached an altitude of 250 miles and a speed of 5,000 miles per hour. Both were records and received a great deal of attention as the American public took interest and pride in the development of this "amazing" new technology.

Later, Bumpers were the first vehicles launched at the new Cape Canaveral in Florida in 1950.

The Navy Sails into White Sands

On June 14, 1946 the Navy sailed into White Sands to participate in the V-2 program. They have remained onboard since. The Navy Research Lab was a major contributor in putting payloads on V-2s. In fact, they fabricated many of the specialized nosecones necessary to accommodate some of the experiments.

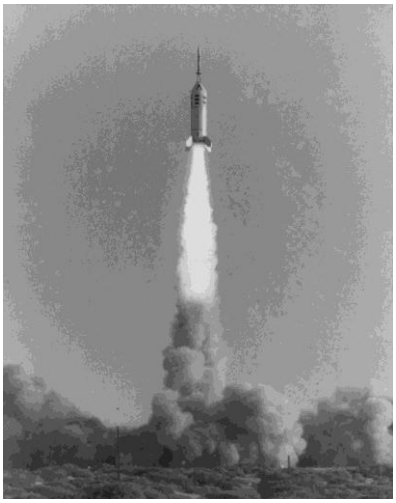
When the V-2 program started to flicker, the Navy sought its own sounding rocket for conducting continued research. Today the Port Hueneme Division Naval Surface Warfare Center Detachment – White Sands continues to conduct space research. They support customer requirements by launching various research rockets. The division has launched some 1,100 rockets. Customers have included NASA, the Naval Research Laboratory, the Air Force Geophysics Laboratory, the Defense Nuclear Agency, Strategic Defense Initiative Organization and various universities. Launch of commercial payloads began in March 1989.

Little Joe

When President Kennedy committed the U.S. to a moon landing by the end of the 1960s, White Sands played a role with many key tests.

For the Apollo program, NASA developed an escape system for the crew if there was a failure during launch. From 1963 to 1966 a series of tests was conducted using a Little Joe II rocket to simulate the Saturn rocket. It was capable of carrying the boilerplate Apollo capsule to an altitude of 31,000 feet at speeds similar to an actual launch.

When the escape system was triggered, the capsule was released from the Little Joe and rockets mounted on top of the capsule pulled it away from trouble. The capsule would then parachute safely to the ground.



In 1966 and 1967, White Sands acquired its "flying saucer" now on display in Missile Park. The "spacecraft" was designed by NASA to test parachute capabilities for slowing down a vehicle landing in the thin atmosphere of Mars. A series of five tests was successfully conducted.

The saucer-shaped UFO, about 15 feet in diameter, was equipped with a series of small rocket motors on the bottom. A Voyager balloon carried the reentry vehicle aloft from Roswell, N.M., to an altitude of 130,000 feet. Once at launch altitude, the vehicle was released and the rocket motors were used to propel it in a high arching trajectory over White Sands attaining an altitude of 140,000 feet. The parachutes would then be deployed for the test.

Space Shuttle Support

The White Sands involvement in the Space Shuttle program became very visible when Columbia landed there after just the third shuttle flight on March 30, 1982. However, the missile range's connection with the shuttle program is older. Beginning in May 1970, a series of drop tests using a

one-tenth size scale model of the shuttle was conducted at White Sands. The model was 13 feet long, about two feet in diameter and had a wingspan of 13 feet. It weighed about 600 pounds.

The model was flown to 8,000 feet above ground by an Army CH-54 "Sky Crane" helicopter and dropped. Its glide to the ground was controlled from a NASA van in the drop zone.

The missile range's Space Harbor is on an old lakebed at the site formerly known as Northrup Strip. Northrup Strip was originally built by the Northrop Corporation to serve as a launch and landing area for drones. It became Northrup Strip after a typographical error was repeated too many times to retract. The name was changed to the White Sands Space Harbor after the 1982 Columbia landing.

NASA selected the site as a shuttle pilot training area in 1976. In 1979 the two lakebed runways that were developed for training were lengthened to 35,000 feet to allow actual landings of returning shuttle orbiters. Pilot training continues at the site with over 90 percent of shuttle training runs taking place at White Sands.

Delta Clipper

In addition to shuttle activities, the White Sands lakebed has seen other testing. From 1993 to 1996, flight tests of McDonnell Douglas' Delta Clipper vehicle were conducted there. The Delta Clipper was developed for the Ballistic Missile Defense Organization to demonstrate single-stage-to-orbit rocket technology. The Delta Clipper was a single-stage, vertical-takeoff and vertical-landing vehicle.

The intent of the tests was to demonstrate that a rocket-powered reusable launch vehicle could be operated and maintained in a manner similar to aircraft. The Delta Clipper's last flight was on July 31, 1996, when one of the landing legs failed to deploy. On setting down, the vehicle toppled over, exploded and burned.

Looking Toward the Future

Today, White Sands continues to play a role in the nation's space activities and looks forward to supporting NASA's Constellation Program with the Orion Abort Flight Test Program

Missile Range Facts

White Sands Missile Range is a multi-service test range whose main function is the support of missile development and test programs for the Army, Navy, Air Force, National Aeronautics and Space Administration (NASA), and other government agencies and private industry.

The missile range is located in the Tularosa Basin of south-central New Mexico. At 2.2 million acres White Sands Missile Range is larger than Connecticut, Rhode Island, and the District of Columbia combined and represents 17 percent of the land owned by the U.S. Army. The headquarters area is 20 miles east of Las Cruces, and 40 miles west of Alamogordo, New Mexico and 45 miles north of El Paso, Texas.