

Historian's Corner

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The Atlas ICBM

The Atlas Inter-Continental Ballistic Missile was America's first ICBM. It was developed as a second strike deterrent to offset the Soviet Union's fielding of nuclear warhead equipped ICBM's capable of reaching the United States. The Atlas configuration proposed in 1953 was 12 feet in diameter and 110 ft long with 5 main engines, weighing 440,000 lb. This design would have made us competitive with the Soviet Union's rockets during the early days of the space race. However, development of the fielded Atlas ICBM configuration started in 1954 after the US demonstrated a smaller but more powerful hydrogen bomb that allowed for a smaller rocket with reduced guidance accuracy. This Atlas ICBM was 10 feet in diameter and 75 feet long weighing 240,000 lb. Atlas' range was specified to be 5,500 Nautical Miles (NMI) with a 3,000-pound warhead. Warhead delivery accuracy (circular error probability) was specified at 2 NMI.

Building of Atlas ICBM sites started at Vandenberg AFB in March 1958. The first site, 576A, used three vertical towers similar to the test stands at Cape Canaveral. Three Atlas D-series missiles were erected at 576A "on standby" during Nikita Khrushchev's train trip up the coast from Los Angeles to San Francisco in September 1959. Operational Systems Test Facilities (OSTFs) and USAF training sites at VAFB followed for the three different Atlas ICBM operational variants.

The operational Atlas D-series, with ground based radio guidance (Azusa), were housed horizontally in above ground concrete structures with a sliding overhead concrete door. The launch sequence, which took approximately 20 minutes, required the door to be opened, the missile pivoted to an erect position, propellants (kerosene and liquid oxygen) rapidly loaded, and engine ignition/missile release. The containment structure was only minimally protective to nuclear attack, and during erection, tanking and launch, the ICBM was exposed and vulnerable to an incoming enemy missile. Each D-series site consisted of three missiles and a launch control center. A total of nine horizontal D-series sites (containing 27 missiles) were fielded. Their locations were Vandenberg AFB near Lompoc, CA (the 576B training site), Warren AFB near Cheyenne, WY (5 sites), and Offutt, AFB near Omaha, NE (3 sites).

The Atlas E-series, also with Azusa radio guidance, was very similar to the D-series, except its concrete containment structure was semi-hardened and located below ground to be less vulnerable to enemy attack. These were commonly called "coffin launchers". However, the Atlas E launch sequence was identical to the D-series missile, so it was just as vulnerable during its erection/tanking period. A total of nine operational E-series sites (containing 27 missiles) plus three "coffins" at VAFB (OSTF-1 and two at 576C) were fielded. Their locations were Fairchild AFB at Spokane, WA (3 sites), Forbes AFB near Topeka, KS (3 sites), and Warren AFB (3 sites).

The Atlas F-series replaced Azusa with all inertial guidance and was stored vertically in a below ground hardened silo. Each F series base had 12 silos, each with its own launch control center. The silo was a hardened concrete structure 80 feet in diameter and 180 feet deep with hinged concrete doors. An eight level steel crib was suspended by compression springs from the silo wall. The crib contained an elevator launch platform and drive mechanism, propellant storage tanks, and other support equipment. In its ready condition, the missile was tanked with kerosene (but not liquid oxygen) and protected from nearby enemy strikes by the suspended silo crib. The launch sequence involved rapidly tanking liquid oxygen, locking the crib to the silo wall, opening the silo doors, driving the launch platform elevator up and latching it to the silo cap, and engine ignition. Thus, the Atlas F missile was in an exposed position for less than 2 minutes. A total of 6 operational F-series sites (containing 72 missiles) plus 3 silos at VAFB (OSTF-2 and

567D & E) were fielded. Their locations were; Schilling AFB near Salina, KS, Lincoln AFB near Lincoln, NE, Altus AFB near Altus, OK, Dyess AFB near Abilene, TX, Walker AFB near Roswell, NM, and Plattsburgh AFB near Plattsburgh, NY.

Support facilities at each base included a Missile Assembly Building for storing a spare missile and maintenance activities, plus Azusa tracking equipment for the D- and E-series sites. Each Atlas ICBM site was located near an existing Air Force Base, with the launch facilities (above ground D bunkers, E coffins and F silos) disbursed around the adjacent countryside.

General Dynamics Astronautics Division was the prime contractor for the Atlas ICBM including site construction specifications for the U.S. Army Corps of Engineers, support specifications for the A&E contractor, all Ground Support Equipment, site checkout, manufacturing the Atlas missile, site activation and selloff to the USAF. The initial D- series horizontal site at VAFB (576B) was turned over to the Strategic Air Command (SAC) in September 1959, followed by the other sites, with the last becoming operational in December 1962. This incredible schedule was driven by the fear that the United States was lagging the Soviet Union in ICBM capability and was vulnerable. It required individual silo construction to start on approximately 10-day centers. Core of Engineer work typically took 1.5 to 2 years per squadron and Astronautics took 8 to 10 months to activate each complex. At the height of silo activation, Astronautics personnel totaled approximately 33,000, plus almost 67,000 supporting subcontractors. Maximum Atlas tank fabrication rate was 12 per month. Total estimated cost for the Atlas ICBM program was between \$6 and \$8 billion.

The Atlas ICBM proved its deterrent capability during the October 1962 Cuban Missile Crisis, when all of the D- and E-series missiles and approximately half of the F-series missiles were on launch ready status. These F-series sites were still being activated, so GD Astronautics civilian crews manned those armed to address the threat for potential retaliation with two USAF Officers to authorize launch. Fortunately, the Soviet Union backed down, and no Atlas was ever launched. The actual capability of the Atlas F-series was a 9,000 NMi range with a 0.5 NMi accuracy.

Unfortunately, the complicated liquid fueled Atlas was challenging for the USAF to maintain on operational status, and it was vulnerable during its erection and tanking. The combination of in-silo launched Titan II ICBMs, with storable propellants and simpler pressurization, plus development of the in-silo launched Minuteman ICBM with its solid propellant, made Atlas obsolete. Deactivation of Atlas ICBM operational sites started in September 1964 and was completed in June 1965 (VAFB training sites in April 1966). The government could find no economic use for the site facilities, so after removing the warheads, missiles and GSE, they were either filled in or purchased by private citizens. Some are still available for sale. A few sites have become museums and can be visited.

Most of the D-, E- and F-series Atlas ICBMs were subsequently launched from VAFB on various missions. 27 D-series missiles were used as Nike Zeus test targets, and 6 were used for the Orbiting Vehicle Program. 87 E- & F-series vehicles were stored at Norton AFB in Riverside, CA. Some were used for spare parts, but the majority were refurbished and performed a variety of orbital launches, with the last E-series vehicle successfully launched in March 1995, more than 30 years after it was built. Each of these old ICBMs was estimated to cost \$2 million, an unbelievable bargain for the American taxpayer.