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Monuments of the US National Defense System
Conservation of Cold War Sites

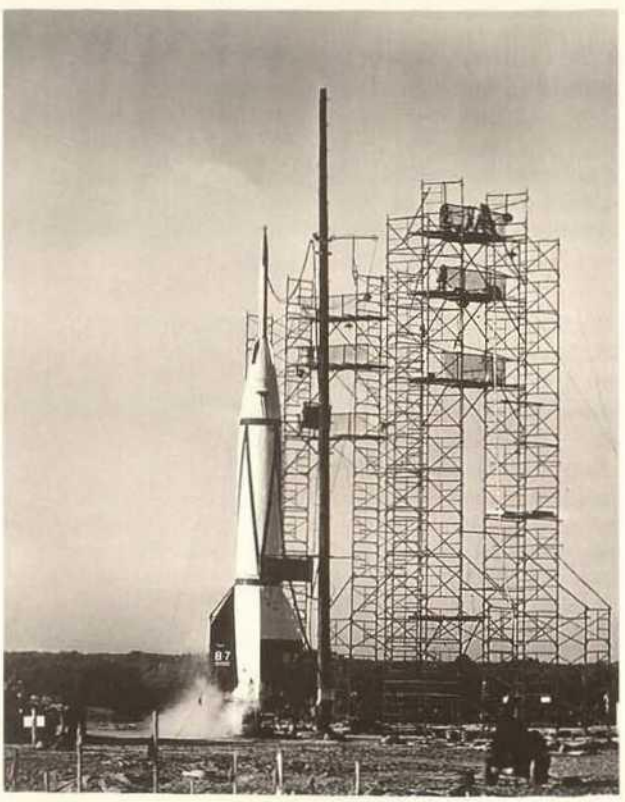
Considered allies during the Second World War, the Union of the Soviet Socialist Republics' (USSR) post-war activities signaled that a new enemy loomed on the horizon. The threat of Communism and a feared Soviet "expansionism" ultimately bent on breaking the international authority of America launched the United States into a Cold War lasting almost a half century. On January 7, 1954 President Dwight D. Eisenhower delivering his first State of the Union address to the Nation, outlined his plans in defending the US against the threat of the "communist conspiracy". Eisenhower's comments reflected the doctrinal basis behind much of America's strategic planning during the Cold War era.

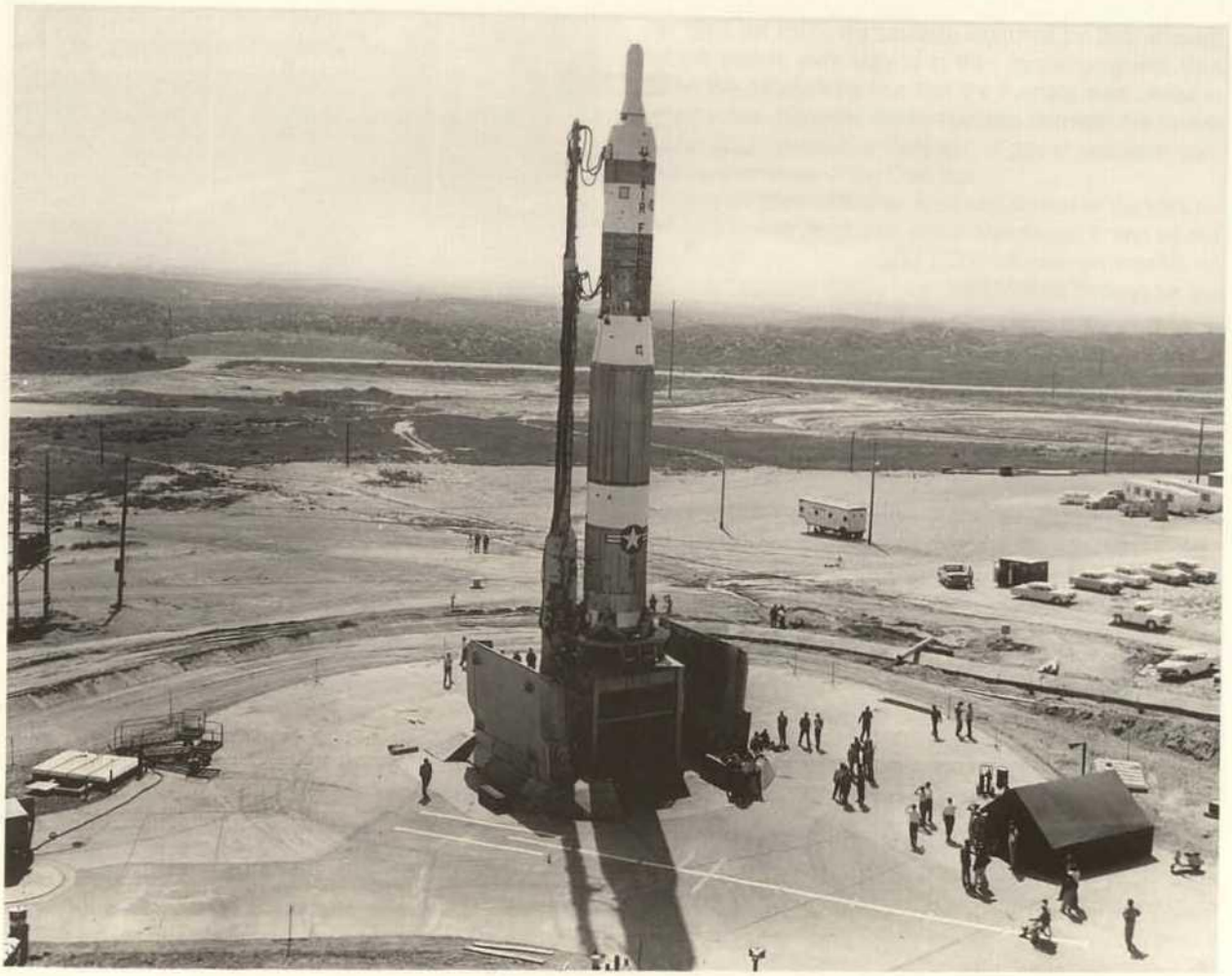
The Eisenhower administration and Department of Defense developed a Cold War defensive posture which relied on a system known as the "strategic triad" composed of three major components: manned bomber facilities, unmanned land-based missiles, and mobile submarine-based missiles. Soon after World War II the US Navy and the new Atomic Energy Commission began experimental projects using atomic fission which lead to the development of a nuclear powered submarine that could go faster and stay submerged longer than existing diesel and electric powered craft. The first nuclear powered submarine, called Nautilus, made its maiden voyage on January 17, 1955. By the late 50's, advances in guidance systems allowed for submarines to carry missiles leading the Navy's Bureau of Aeronautics to develop a submarine-launched cruise missile – small, unmanned aircraft that would fly over short ranges under the control of advanced autopilots.

Given the intercontinental ballistic missile (ICBM) threat posed by the Soviets during the mid-1950's, a rapid response airborne program to deploy nuclear bombs was adopted by the Air Force Strategic Air Command (SAC) in October 1957 and was maintained continuously until the effective end of the Cold War in 1991. These alert facilities for both aircraft and personnel consisted of a semi-subterranean building with ramped tunnels to house bomber crews. Co-located with the personnel building were B-47, B-52 and later FB-111 bomber aircraft set ready on runway aprons in a classic "Christmas Tree" configuration consisting of a center concrete taxi ramp with 2 or 3 aircraft pads on each side set at 45 degree angles. This arrangement allowed for the fast start and taxi of bomber aircraft with a minimum of low speed maneuvering. The taxi ramp connected directly to the active runway to minimize taxi time. The Bomber Alert Facility allowed for maximum readiness and rapid deployment in response to Soviet aggression thereby meeting the Strategic Air Command strategy of deterrence. While all three "strategic triad" components remained activ during the entire Cold War, the submarine and bomber components of the triad were quickly overshadowed by the development of land-based missiles and by 1964, the number of missiles standing alert exceeded the number of bombers.

During the late 1940's and early 1950's the United States exploited its position as the sole possessor of the atomic bomb, and focused its efforts on achieving economic growth with large cuts in military spending. Meanwhile, the Soviet Union had mounted a massive effort to rebuild its army and replenish conventional weapons after World War II. The United States' nuclear superiority seemed secure until 1953 when the Soviets exploded their own thermonuclear device known as the "H-bomb". For the first time, the Soviets seemed poised to take the lead in the race for arms superiority. While America's ability to deliver nuclear payloads using conventional aircraft remained a standard defensive strategy, significant advances were underway in both rocket engines and guidance systems that made long-range missiles practical, and by May 1954 the Air Force had mapped out a plan for the development of the intercontinental ballistic missile. Early development of America's missile program started with research and experimentation using the German V-2 rockets (fig.1). In fact many V-2

Fig. 1 These early modified German V-2 rockets were used for research and development of liquid-fueled ICBM's. Many German V-2 scientists ended up in the American missile programs after World War II.





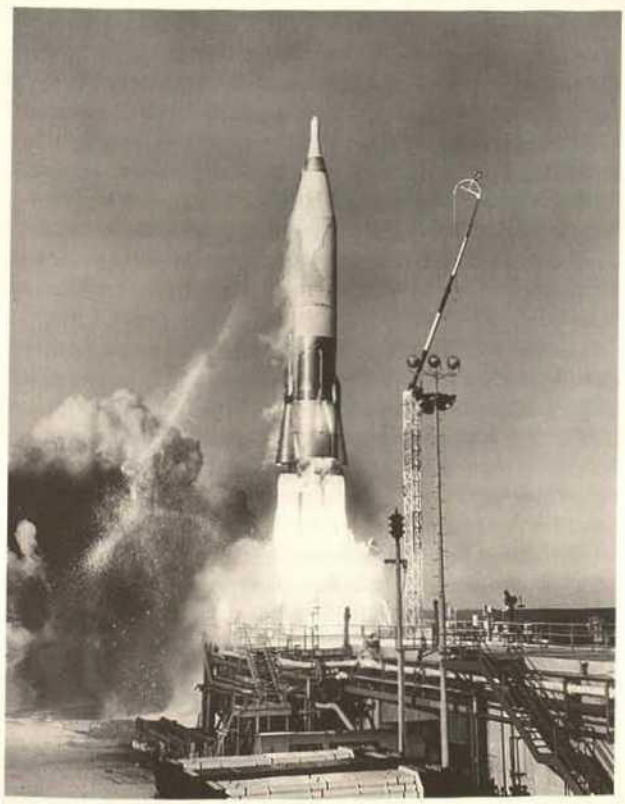


Fig. 2 (above) A view of the installation and check-out of a Titan missile positioned above the ground as it would be for a launch.
Fig. 3 (lower left) The Atlas missile was essentially a highly evolved version of the German V-2. Development of the solid-fueled Minuteman missile accelerated the early retirement of the first generation of liquid-fueled ICBM's such as the Atlas.

scientists ended up in the American missile program after the war. The Nation's first ballistic missiles were the liquid-fueled Atlas (fig. 2), designed to be stored underground and raised to the surface for launching. Later the Titan missile (fig. 3) was developed as a hedge against the failure of the Atlas. Hampered by technical complexity and funding problems, both Atlas and Titan were short-lived and were completely retired by 1965.

During this early Cold War period, defending against an unknown but potentially terrifying Soviet threat was so urgent that even the fast-track development of Atlas and Titan was unacceptable. So the US government instituted two more programs to build stopgap missiles of the 1,500-mile range more quickly. These missiles, to be based in Europe, were the Air Force's Thor and the Army's Jupiter developed in 1954.

During the same time that Thor and Jupiter were being developed, the Army was working on a liquid-fueled anti-aircraft missile named Nike, designed to knock down Soviet bombers

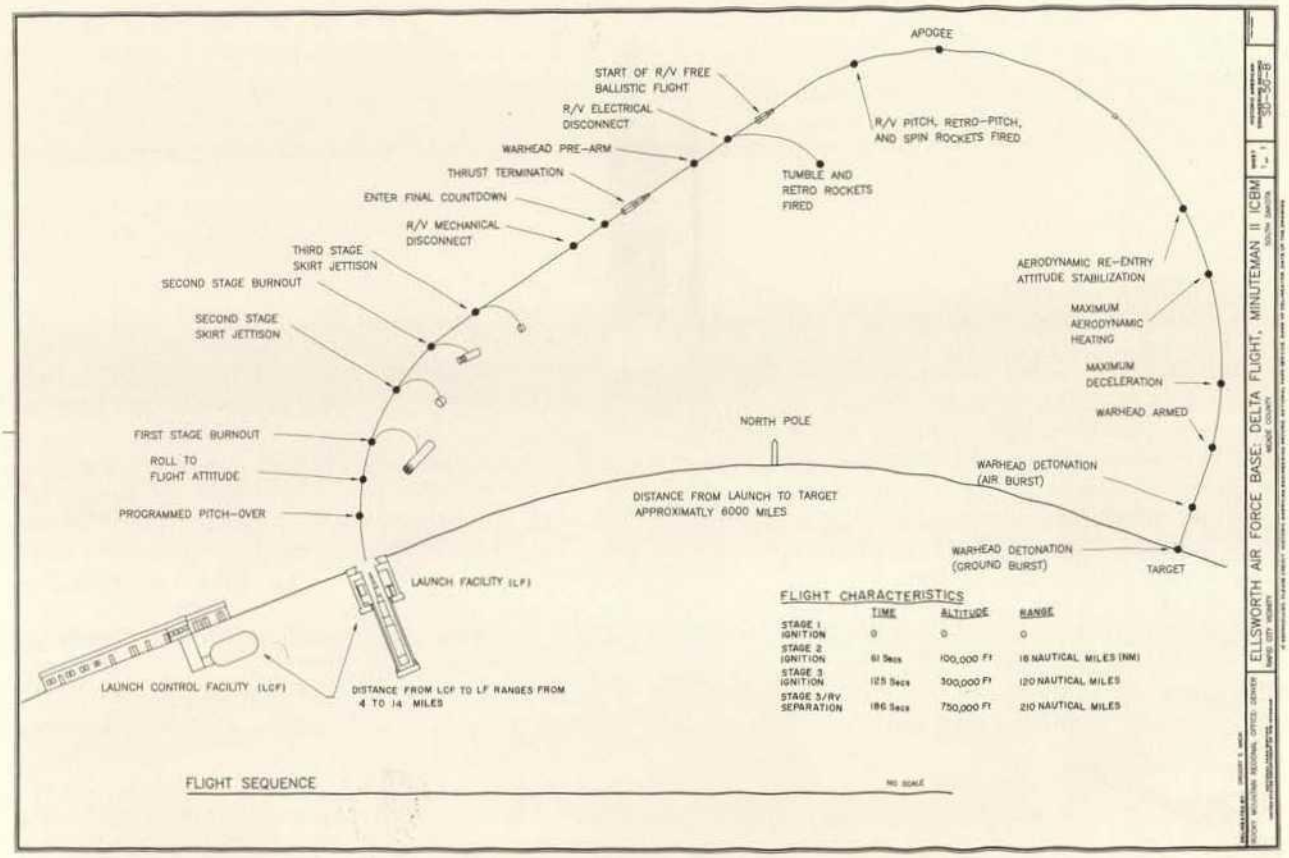
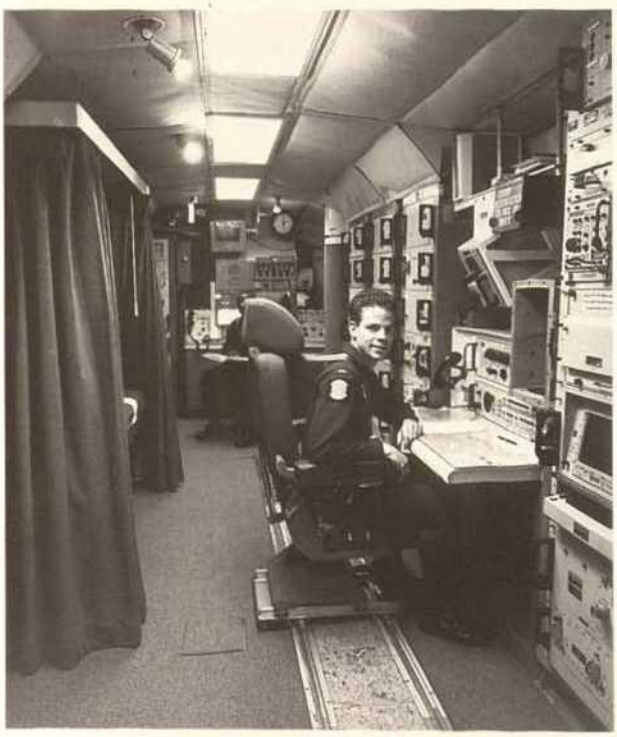


Fig. 4. HAER drawing showing the relationship of the Launch Control Facility and the underground Minuteman missile (Launch Facility). The drawing also shows how the stages of the solid-fueled missile could reach its target nearly 6000 miles away within 30 minutes.

Fig. 5. The operational center of the Minuteman missile system was the underground Launch Control Center. Here two man missile crews were stationed 24 hours every day of the year and could be alerted to launch 10 remote nuclear-tipped Minuteman missiles.



should they approach North America. The Nike missile system was first activated in 1953. It was a complex missile with over 300,000 parts and was designed to be stored underground and had to be fueled and raised to the surface prior to launch. A latter more powerful solid-fueled version of Nike, called Hercules, was developed to intercept both aircraft and missiles. Yet another solid-fuel Nike called Zeus was latter developed in 1963 to intercept only incoming Soviet ICBM's, but it was never deployed.

In October 1957, when the Soviet Union announced it had used a liquid-fueled ICBM to launch the world's first satellite, Sputnik, into orbit, the Eisenhower administration quickly increased the Nation's annual space research and development budget by more than twenty-fold within six months. As a result, a new solid-fuel missile began development in early 1958 called Minute Man. At the end of 1960, the Air Force took the first Minuteman missile to Cape Canaveral, Florida, for flight testing. The compact new missile was only six feet in diameter and 53 feet high – about half the size of a Titan. The first Minuteman missile "shot up like a skyrocket" on February 1, 1961, burning the three propulsion stages flawlessly and delivering the unarmed warhead 4,600 miles away in the Atlantic Ocean.

The new solid-fueled Minuteman Missile was a more flexible and safer system than Atlas or Titan and was to be sited inside

Fig. 6 In May 1964, the Soviet Union displayed a battery of antiballistic missiles in Moscow's Red Square prompting concern about the vulnerability of America's ICBM's.

underground facilities and positioned to launch within a minimal time frame (fig. 4). With Minuteman added to the Nation's arsenal, America acquired its first truly push-button missile system. Seen as a successful, and progressive counter to the Soviet missile threat, the Air Force was determined to deploy as many as 1,500 missiles all over the nation. But when early models fell short of their intended 5,500-mile range, the Air Force selected sites only in the northern part of the United States, which were closer to the Soviet Union. On March 16, 1961 the Air Force began constructing the Nation's first Minuteman Missile field. Organized into a series of administrative units called "wings", each was comprised of three or four 50-missile squadrons. Each squadron was further subdivided into five smaller units, called "flights". A flight consisted of a single, underground Launch Control Center, linked to ten, unmanned, underground missile silos. The silos were separated from the Launch Control Center and from each other by a distance of several miles. Each eighty foot reinforced concrete silo, called a Launch Facility, housed one Minuteman missile covered by a rolling, 120-ton concrete door on the ground surface. The Launch Control Facility is a separate site from the Launch Facility and houses the underground command center (Launch Control Center) accessible by elevator from the surface Crew Support Building above. Two highly trained missileers served on alert in the underground Launch Control Center 24 hours a day, every day of the year (fig. 5). At higher states of readiness, the crew strapped themselves into their seats to await launch commands authorized directly by the President of the United States.

In October 1962, the Cuban Missile Crisis thrust the world to the brink of apocalypse for 13 days as President Kennedy insisted that Soviet leader Khrushchev remove missiles from Cuba. This prompted Kennedy to quickly put the first Minuteman missile flight on alert at Malmstrom AFB, Montana. The Minuteman was referred to as the "ace in the hole" by Kennedy and served as a catalyst for a peaceful resolution to the conflict. In the same year, East Germany closed the Berlin Wall's "Checkpoint Charlie" and the two superpowers stood eyeball to eyeball. A few days later, the Soviets tested a 60-megaton bomb, the largest in history.

In 1961 Air Force spy satellites launched by Thor showed that the Soviets were lagging in their missile programs, thus ending the decade-long fear that the Russians were ahead in the arms race. However, the competition between the Soviets and the US to maintain a "balance" of power was never concluded until the end of the Cold War.

During the early 1960's, an improved version of the Minuteman Missile was developed, called Minuteman II, and by the end of 1967, the Nation had 1,000 Minuteman missiles on alert in six separate deployment areas located throughout the north-central United States. With advances in strategic defense policies during the early 1960's, the newer Launch Control Centers included an adjacent underground generator and air filtration capsule to allow longer periods of life support for the control center.

Then in May 1964, the Soviet Union displayed a battery of anti-ballistic missiles in Moscow's Red Square (fig. 6), prompting concern about the vulnerability of Minuteman I and II missiles. A more advanced Minuteman was designed with a warhead that could deliver three hydrogen bombs that "thrust the world into a new era of weapons for mass destruction". In July 1975, the last of the Nation's Minuteman III missiles were lowered into underground silos.

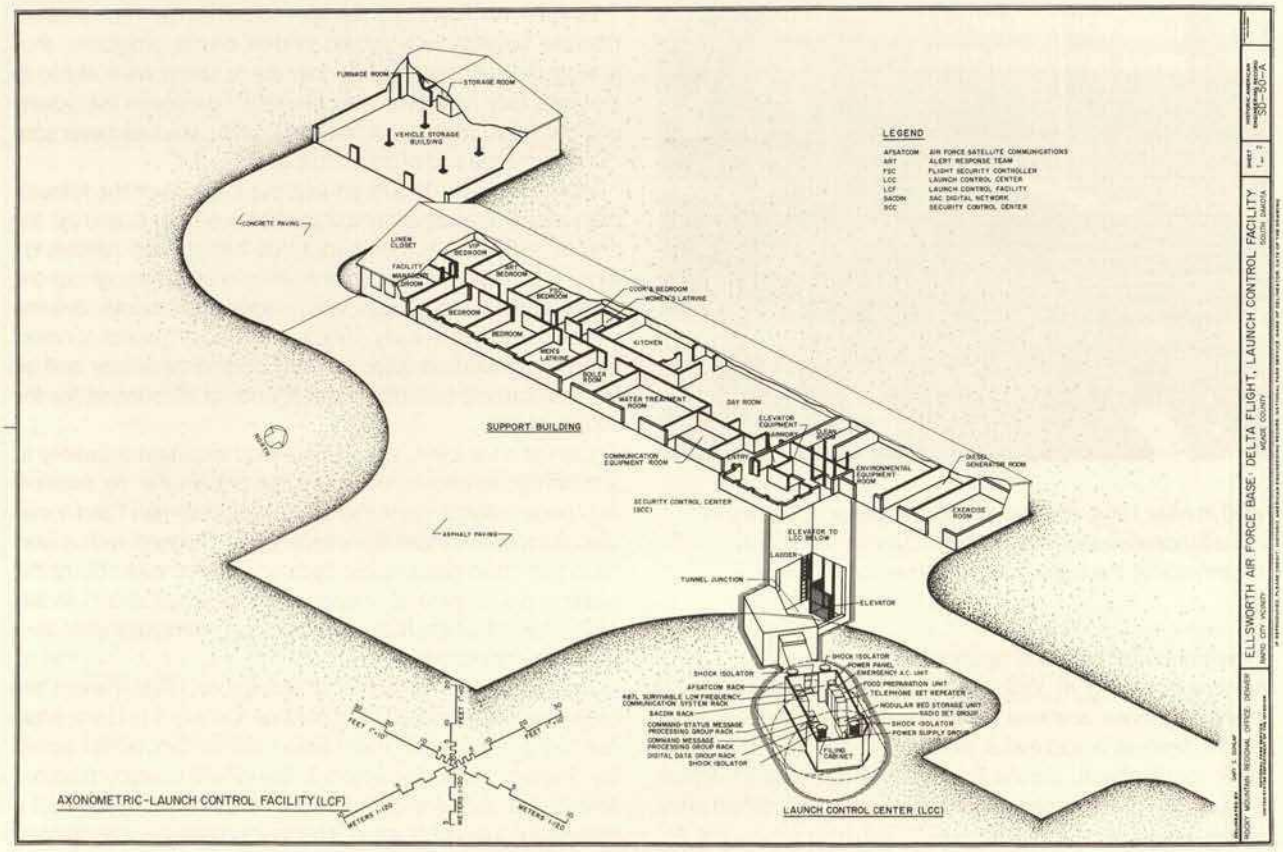
The fall of the Berlin Wall in November 1989 marked the beginning of the end of the Cold War. On July 31, 1991, President George Bush and Soviet leader Mikhail Gorbachev signed the Strategic Arms Reduction Treaty (START), which placed a limit on the world-wide number of ICBM's and prescribed a process for their destruction. The treaty coincided with the end of the Cold War.

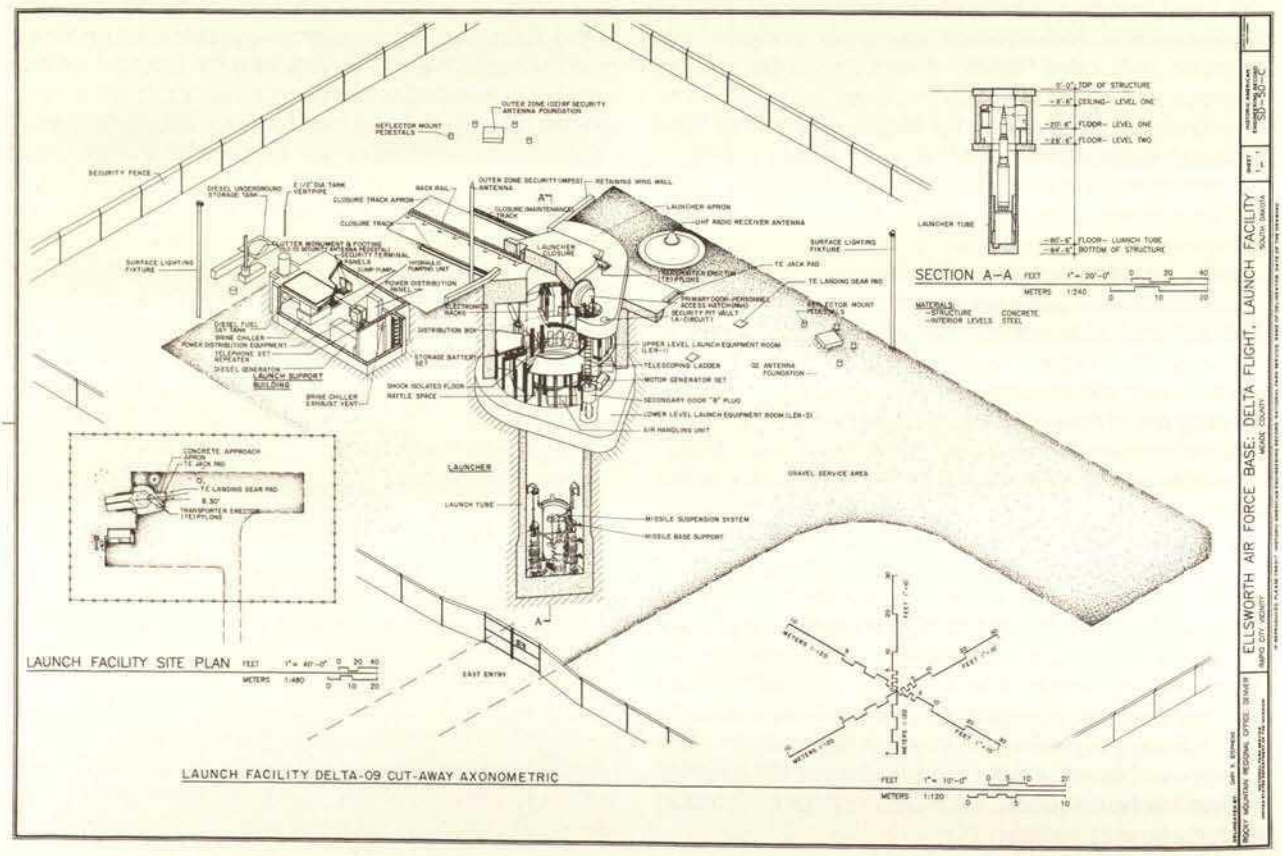
Conservation

The normal process of formally recognizing historic sites in the United States requires a 50-year-time requirement to achieve a historical perspective prior to beginning the process of recording and preserving sites. However, for events that are of transcending importance, it is not necessary to wait the 50 years to begin preserving the resources. Recognizing that resources from the Cold War should be examined before they were destroyed by requirements of START or forces of time, the US Congress established the Legacy Resource Management Program (Legacy) as part of the Defense Appropriations Act of 1990. The bill established nine separate legislative purposes, the last of which was: "to inventory, protect, and conserve the physical and literary property and relics of the Department of Defense, in the United States and overseas, connected with the origins and the development of the Cold War". To carry out this initiative, competitive grants were awarded for demonstration projects.

Ellsworth Air Force Base Project

In 1992, Legacy funded a project to create a historic context study for the Minuteman ICBM's and to record and study the feasibility of preserving one of these Cold War icons before they were systematically destroyed by the fall of 1994. The Nation's second installation of Minuteman I missiles was at Ellsworth Air Force Base, South Dakota, in July of 1963. Due to changes in later installations and modifications to the facilities at Malmstrom Air Force Base (the Nation's first installation of Minuteman I missiles), the facilities at Ellsworth's 44th Missile


LEGEND
APSATCOM AIR FORCE SATELLITE COMMUNICATIONS
ART ALERT RESPONSE TEAM
FSC FLIGHT SECURITY CONTROLLER
LCC LAUNCH CONTROL CENTER
LCF LAUNCH CONTROL FACILITY
SACDIN SAC DIGITAL NETWORK
SCC SECURITY CONTROL CENTER
SUPPORT BUILDING
LAUNCH CONTROL CENTER (LCC)
AXONOMETRIC-LAUNCH CONTROL FACILITY (LCF)
ELLSWORTH AIR FORCE BASE: DELTA FLIGHT, LAUNCH CONTROL FACILITY


SECTION A-A
LAUNCH FACILITY SITE PLAN
LAUNCH FACILITY DELTA-09 CUT-AWAY AXONOMETRIC
ELLSWORTH AIR FORCE BASE: DELTA FLIGHT, LAUNCH FACILITY

Wing were considered the most intact early example of a Minuteman I system and therefore chosen as the site for the Legacy context and preservation feasibility studies.

In early 1993 the Air Force along with the National Park Service, the country's largest preservation agency responsible for the conservation of the Nation's historic resources, entered into several Interagency Agreements to accomplish the Legacy-funded project at Ellsworth. Additional partnerships were formed with the South Dakota State Historic Preservation Office, Badlands National Park, the Air Force Museum at Wright-Patterson Air Force Base, and the South Dakota Air and Space Museum. The START required demolition schedule for the missiles at Ellsworth was altered so that two Minuteman facilities, the Delta Nine Launch Facility, and Delta One Launch Control Facility, were placed last on the list to be destroyed, so that a National Park Service Special Resource Study, to determine the feasibility and suitability of preserving them as historic sites, could be completed.

The two-year study was completed in early 1995 and describes three conservation and management alternatives for the sites. Under Alternative One, there would be no acquisition or preservation of Delta One and Delta Nine. The Air Force would de-activate and demolish Delta One and Delta Nine, as has been done with other Minuteman I sites associated with the 44th Missile Wing. Alternative Two calls for a qualified non-profit organization or government agency other than the National Park Service to acquire Delta One and Delta Nine and make them available for public visitation, similar to the Titan Missile Museum near Tucson, Arizona. To date no qualified government or non-profit organization has expressed any interest in acquiring these sites. Under Alternative Three, the National Park Service, in conjunction with the Air Force Museum, would acquire, conserve, and interpret Delta One and Delta Nine as a National Historic Site. The site would commemorate the history and significance of the Cold War, the arms race, and ICBM development in the United States. Once complete public comment has been received and evaluated, a final report and recommendation will be issued sometime in the year 1996.

The National Park Service has also completed Historic American Engineering Record (HAER) as-built archival documentation consisting of drawings and photographs and a National Historic Landmark Nomination of these two facilities as part of the project (fig. 7,8). Design and construction drawings for providing a viewing stand for the Delta Nine Launch Facility consisting of a glass cover to allow visitors to see the underground missile are also being completed by the National Park Service and will be constructed in the Spring of 1996.

Whiteman Project

Another Cold War conservation project underway by the National Park Service is the archival recordation of the Minuteman II Oscar One Launch Control Center, and Launch Facility trainer at the 351st Missile Wing at Whiteman Air Force Base, Missouri. The 351st was the Nation's most southern Minuteman wing and was commissioned on June 14, 1961 with the final Launch Facility construction finished in November 1962. The 351st Missile Wing at Whiteman represents the second generation of the Minuteman Launch Control Facility employing two underground capsules, a Launch Control Center and a second underground hardened concrete capsule housing a generator and air filtration system to support the launch crew for extended periods of time. Work on this project is in the beginning stages and involves HAER recordation of both sites and the conservation of Oscar One as a historic site open to the public. Adjacent to Oscar One at Whiteman is the last remaining Minuteman II Launch Facility Trainer used to train missile maintenance crews. As-built HAER recordation consisting of drawings and photographs of the Launch Facility trainer will complete the missile phase of the project.

The second part of the project at Whiteman involves recordation of the 509th Bomb Wing, Bomber Alert Facility built in 1952. This Alert Facility with its semi-subterranean structure and adjacent aircraft alert apron has remained remarkably intact despite minor modifications to support subsequent uses.

Summary

Unfortunately, base closings and reorganization in the US military have resulted in the loss of countless resources associated with the Cold War. While the conservation efforts of Cold War sites continue, it must be recognized that now is the best time to study the entire record and determine what must be passed on to the future. At no other time will the historical record be more complete than now. As important sites are identified both in the US and in Europe, a united effort involving governments, military, and preservation agencies must come together quickly, if these sites are to be saved. Alliances between national and international conservation agencies should be formed to allow for Cold War sites in Europe and the former Soviet states to be conserved. In this regard, the National Park Service has applied for Legacy funding to identify these sites and establish important necessary alliances. With funding from Legacy, the National Park Service is committed to continue conservation efforts of the monuments of the Cold War.

Fig. 7 (upper left) Historic American Engineering Record as-built drawing of Delta One Launch Control Facility showing the above ground support building and below ground hardened concrete control capsule.
Fig. 8 (lower left) Archival drawing of the Delta One Launch Facility showing the below ground launch tube which held one Minuteman ICBM. Above the missile tube was a 120 ton concrete blast door that was to be jettisoned in the event of a launch.