# RING OF FIRE

# Could Nike missiles have protected U.S. cities from a Soviet attack?

by James R. Chiles

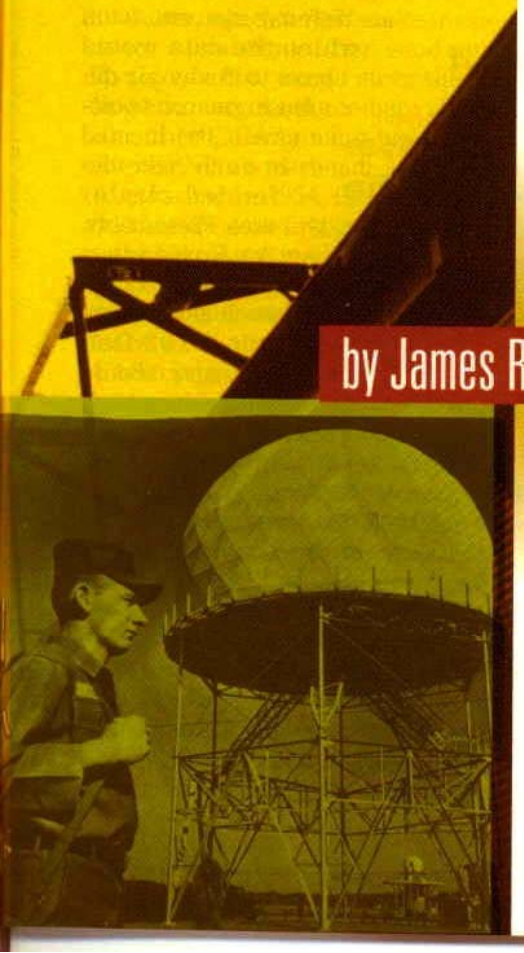
I met Frank Evans last December at LA-96, a decommissioned Nike missile site on Air Force property in Van Nuys, California. Evans had served at missile bases from 1957 to 1969, by which time he held the position of executive officer. Now semi-retired and living in Burbank, he has committed himself to a project that will teach the public about the era of the Nike missiles. For six years, Evans and his Los Angeles Air Defense Museum Association have been restoring another Los Angeles Nike site, LA-43, to its cold war state. Their site needs an elevator platform, and they have obtained permission to remove the one from LA-96.

Evans and I walked from cheery December sunlight down into a dank cavern, illuminated by only a few tiny shafts of light leaking around the elevator platform and by a single floodlight in a far corner. This was the magazine, where the Nike missiles were stored. It was about the size of an elementary school gymnasium and empty except for a few piles of electrical equipment. The east wall was marked with graffiti, but otherwise the chamber was in good order.

With Evans was Scott L'Ecuyer, a fellow cold war veteran, and Master Sergeant Mike Oller, the military liaison detailed to help Evans' group remove the platform. The three plotted how they could rig a crane to help disengage the platform from four rusty support bars at ground level.

L'Ecuyer told me that the Cold War Veterans' Association hopes to carry out a similar restoration at a Nike base in Lorton, Virginia. Still more restoration efforts are planned or under way at sites in Sandy Hook, New Jersey; Fort Tilden, New York; the Florida Everglades; and near Porter, Indiana.

Later, Evans led me along hilltop paths to a concrete pad a little more than three miles from LA-96's launcher complex, overlooking the San Fernando Valley to the north. This spot was once inside the site's fenced radar complex. Evans pointed out the locations of two other Nike batteries, nestled in the mountains on the horizon. During the cold war, Nike batteries



*The first U.S. guided anti-aircraft missile, the Nike Ajax (opposite) was developed to defend cold war America. The Army made sure the missiles themselves were protected; at left, a soldier keeps watch near a radar installation on a Nike site at Huntsville, Alabama's Redstone Arsenal.*

OPPOSITE: NASM (SI NEG. #9A 02923); INSET: US ARMY REDSTONE ARSENAL


NASM (S) NEG. #9A02936

*Crews stage a readiness drill in Chicago in 1959. This Nike is a Hercules, designed to carry a nuclear warhead.*

were arrayed around cities, industrial centers, and bomber bases thought to need anti-aircraft defense. In the 1950s, the Los Angeles area was the major hub of the U.S. aerospace industry, so it ranked high on the list of U.S. cities thought to be vulnerable to an attack by Soviet bombers; at one point, the city was ringed by 16 Nike batteries. New York had 20, and the Navy's harbor facilities at Hampton Roads, Virginia, had eight. Even Midwest cities like St. Louis and Omaha had Nikes.

Over the course of 25 years, the United States and its allies built at least 340 Nike sites around the world; 145 were built in the United States. Most amounted to tiny military bases, complete with mess hall, barracks, recreational facilities, a PX, and a barber shop.

The United States' investment in anti-aircraft systems was immense. Nike system equipment alone cost close to $2 billion; by one estimate, through 1965 the military air defense network, of which the Nike was a critical part, cost more than $50 billion.

Though the Nazis experimented with the concept, the Nike was the world's first operational guided surface-to-air missile, or SAM. Lieutenant Jake Schaefer of the U.S. Army began pondering anti-aircraft missiles in 1944, and the following February convinced the Army to start developing them. Schaefer's original plan, based upon simple, mass-produced, high-speed anti-aircraft missiles directed by ground radar and computers, set the course for the entire Nike era. An Army colonel by the name of Gervais Trichel loved classical literature and suggested renaming the Army's new "Anti-Aircraft Guided Missile" after the Greek winged goddess of victory.

Initially, little happened to boost the Nike's prospects. According to an article in a 1949 issue of *Aviation Week* magazine, Navy experts doubted that Soviet bombers had enough range to make it to the United States. But such confidence soon started to fade. That year, the Soviets successfully tested an atomic bomb, and Soviet premier Joseph Stalin demanded that designers provide him a bomber with a 10,000-mile range, sufficient for an attack on the continental United States. The following June, Communist forces invaded South Korea. Soviet espionage agents were discovered working on a list of U.S. targets to bomb and probing North American air defenses. Civil defense planners estimated that two A-bombs carefully aimed at the Chicago-Gary area would take out a third of U.S. steel production. The threat of Soviet atomic bombers streaming over the Arctic to reduce the United States to rubble began to seem a lot more realistic, and defense spending took off.

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Military planners envisioned the Nike as part of an array of defenses. If a flight of enemy bombers were to come in over the North Pole, it would show up first on a North American web of long-range search radar, extending north into the Arctic Ocean via ships and airplanes. This radar was constantly feeding information to a national air defense system, from which the data would pass to Army air defense command posts (AADCPs), located in each Nike-defended city or area. Presumably, Air Force interceptor aircraft, such as the Convair F-102 Delta Dagger, would knock down most of the bombers as they flew toward their target; the AADCP in Los Angeles would mark any surviving bomber formations on its radar screens and assign them to various batteries. Meanwhile, crewmen at the alerted sites would rush Nike missiles to the surface for launch.

A Nike would take off almost as if shot out of a cannon, hitting a speed of 1,700 mph in less than four seconds. Then it would drop its first-stage mo-


NASM (SI NEG. #9A02933)

*One former radar officer recalls his Alaska Nike site having "the biggest, meanest dogs I ever saw in my life. If told to attack, they would not stop until the person was dead."*

tor and follow guidance instructions transmitted to it from its home base.

To carry out its mission, the Nike needed three sets of radar. All three installations were large and located at the base. First, an acquisition radar swept the horizon, looking for a potential enemy. If one was detected, the target-tracking radar sent up a spotlight beam to lock on to the target. A third set, the missile-tracking radar, kept in constant touch with the Nike. The radar data was fed to the base's computer, which would make the necessary calculations, then send up radio signals that would steer the missile to the target's immediate vicinity. Once there, a command would detonate the Nike's warhead.

Beginning in 1954, the Army mobilized 14,000 of the first-generation model, the Nike Ajax, made by the Douglas Aircraft Company. Each had about the same dimensions as a telephone pole. Bases went up in Missouri pastures, on hilltops in Alaska, and next to high-rise apartment buildings in Chicago.

Despite broad public support for national defense, "not in my back yard" resistance to various sites sprang up. One reason was fear of the Nike booster. Three seconds after each launch, the steel case of the solid-fuel booster fell free, usually crashing to earth a mile or two from the launch site. Cast-off boosters never did kill any Americans, but in time Nikes were involved in two well-reported mishaps. In April 1955, a Nike was accidentally launched from a battery at Fort Meade, Maryland; the missile broke up at low altitude, and the fragments fell onto the Baltimore-Washington Expressway, but no one was injured. And in May 1958, while ordnance personnel and soldiers were installing new arming mechanisms in the missiles at a battery near Middletown, New Jersey, eight Nikes exploded or burned on the ground; 10 men were killed and three were injured.

Other objections to the sites were raised, most centering on the property that had to be sacrificed for the batteries. In Cleveland and Chicago, city officials objected to having to give up park land. In central Chicago, the Army planned to put a Nike base on Wooded Island in Lake Michigan, which, unbeknownst to the planners, was where hundreds of suitors had proposed marriage. And in laying out its first batteries around Los Angeles, the Army penciled in one near the city's international airport, with the radar complex planted on the centerline of one runway's instrument approach. Assuming that future execution of the airport's master plan would extend that runway, airliners on approach could be clearing the Nike radar antennas by as little as 20 feet. Mayor Norris Poulson claimed that the Army would be threatening the lives of millions of people who used the airport yearly. The Army changed its plans, and within two years the mayor was on the Nike's side. After watching a live test firing of a Nike, he told reporters, "I would like to have the Russians see this. Then maybe they would quit their bluffing."

Despite such civilian accounts, insiders knew that staging a launch was no easy matter. "Ajax was a cute little missile but it was a pain in the butt to fuel," says Rod Van Ausdall, a master sergeant at Nike batteries in Texas and Germany. The fueling crew had to wear protective clothing from head to toe when handling a dangerous oxidizer called red fuming nitric acid. "Imagine being in Texas, with the temperature 120 degrees in the shade, wearing a full rubber suit," Van Ausdall says.

NASM (SI NEG. #9A02925)

*Fueling the Nike Ajax required crews to don clothing to protect them from an oxidizer called red fuming nitric acid, a chemical that is nasty enough to cause emphysema, pulmonary edema, circulatory collapse, and a miserable death.*

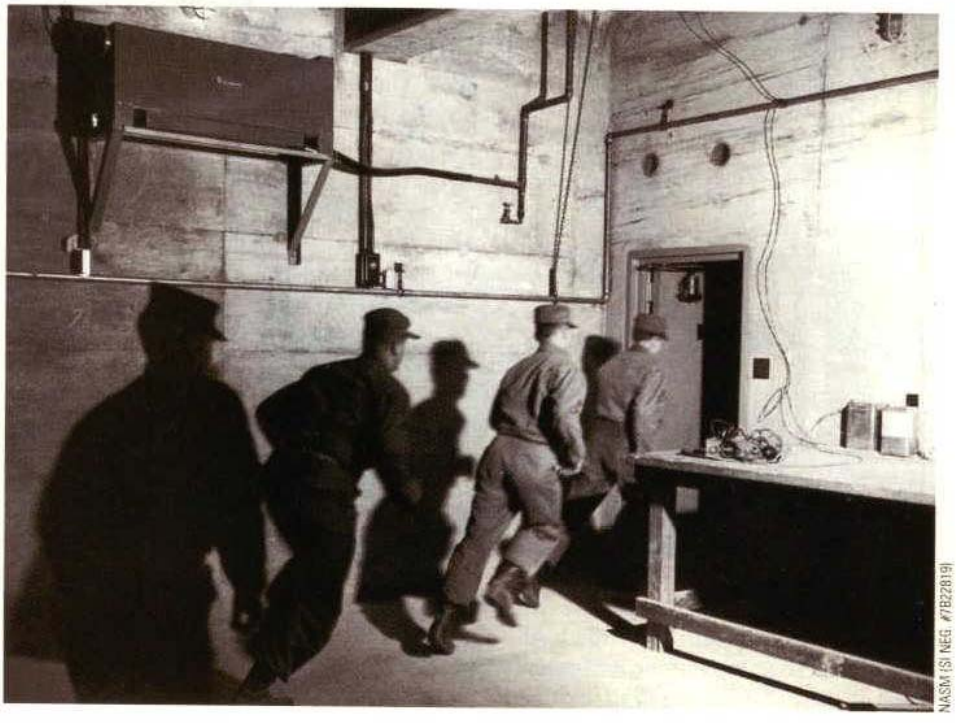
From tests it conducted, the Army realized that if Soviet bombers approached in a tight formation, the guidance radar back at the battery could not track the multitude of identical signals and was likely to send the Ajax missile between airplanes, where its fragmentation warhead would explode without effect.

A nuclear blast, on the other hand, could destroy all the bombers in a tight formation—every airplane within miles, in fact. But a nuke capable of such damage would be too heavy for the Ajax to carry. So even before that model had been fully deployed throughout the United States, the Army commissioned a greater-capacity successor, later called the Nike Hercules. When perfected, the Hercules used a safer solid fuel for propulsion, and its range was four times greater than the Ajax's. The Army therefore could protect the same number of cities with fewer missile bases. After the June 1958 rollout of the Douglas-built Hercules, Ajax bases either underwent conversion to accommodate the new model or just closed down.

**Everything about the Nike Hercules' nuclear warheads was strictly off-limits. The launcher areas were secured by "shoot to kill" borders.**

The debut of the nuclear-warhead-carrying Hercules ended the more relaxed atmosphere typical of a Nike Ajax base. Ajax bases in populated areas had been hosting tours for Boy Scouts, Chambers of Commerce, and anyone else interested, but with the magazines now holding nuclear weapons capable of up to 40-kiloton explosions, show-and-tell seemed inadvisable. One base came up with a more limited tour in which the crew brought up a single unarmed Hercules missile on the elevator platform, allowing onlookers to see it from behind a fence.

Essentially everything about the Hercules' nuclear warheads was strictly classified and off-limits. Troops couldn't acknowledge whether any such weapons were even present on the bases. The Nike sites' launcher areas were secured by "shoot to kill" borders. Attack dogs, loyal to no one but their handlers, patrolled the zone.



NASM (S) NEG. #78228191

*Crews drilled regularly to prepare for a launch, but no Nike was ever sent after an enemy aircraft.*

*Practicing at a New York City Nike site, one crewman (standing) plots an aircraft's approach on a chart, while the other two watch a radar scope to track the aircraft and the missile sent after it.*

In a February 1961 episode of the television show "Lassie," the collie helps train a cowardly dog to serve at a Nike site, but the reality was far grimmer. "Those guard dogs, they'd kill you," says Dale Nichols, an acting battery commander at KC-60, near Gardner, Kansas. "They'd even tear each other up."

The introduction of the Nike Hercules also revived a feud between the Army and the Air Force over whose anti-aircraft missile was better. In May 1959, the Air Force leaked to the news media a report that during an air defense exercise the previous fall, a Nike Hercules had been able to "shoot down" only one of 12 attacking bombers. And the September 1, 1958 edition of the *Chicago Sun-Times* reported on a secret Air Force study claiming that Chicago could be better defended by scrapping the city's 21 Nike Hercules bases,

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because the missile "cannot cope with Russia's fast new bombers." Instead, the Air Force proposed relying on just three bases housing the Nike's Air Force rival: the Bomarc. It was a brash claim; the Bomarc self-guided cruise missile was to be powered by ramjets rather than rocket engines, and that technology was still causing problems.

The feud dated back to the introduction of the Nike. To the Air Force, guided missiles were creatures of the air and so fell under USAF jurisdiction. In the Army's view, shooting at enemy aircraft from the ground was obviously related to artillery and battlefield protection, and thus was an Army job. The Army may have helped stoke the fire; in December 1955 it gave the *New York Times* a report that a Nike had shot down an Air Force Matador missile during a test over the White Sands missile range in New Mexico. A year later the Air Force countered by leaking staff reports that claimed the Nike was "completely unsuitable" for air defense. Even the U.S.S.R. entered the debate. The May 1957 issue of the aviation journal *Sovietskaya Aviatsia* sided with the Air Force, declaring: "As it now exists, the highly praised Nike system is far from perfect."

NASM (SI NEG. #95-8681)

*An aerial view shows the launchers (at right) at the Nike site at San Francisco's Fort Winfield Scott.*

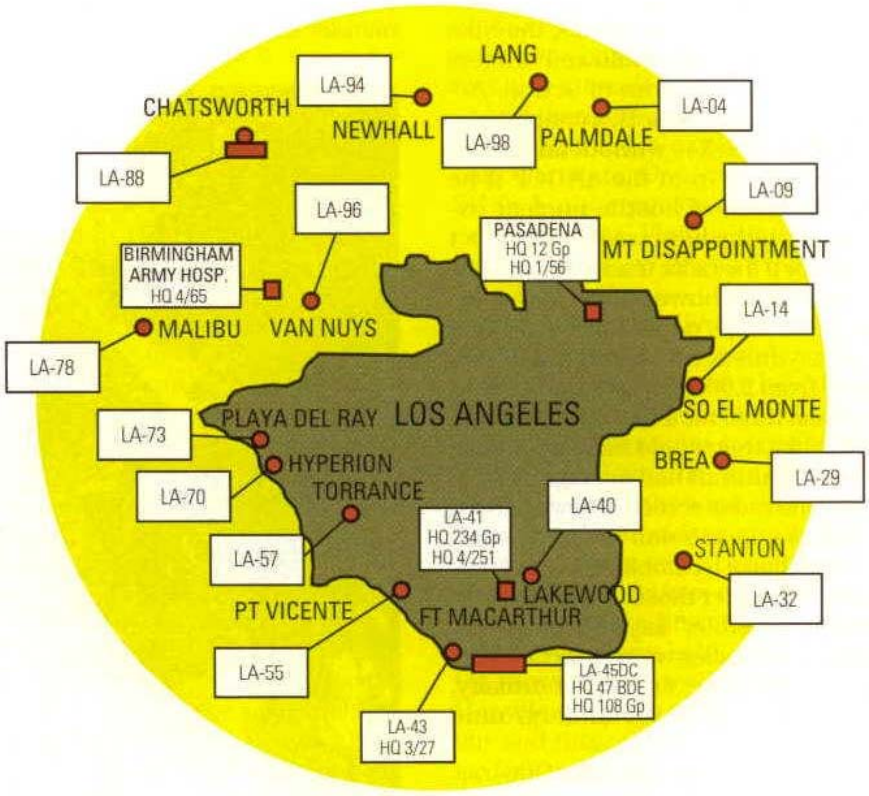
The debate opened to public view some of the difficulties that any SAM was going to face should war come. The Soviets might well field a host of countermeasures: unmanned decoy aircraft, intense radar jamming, electromagnetic-pulse weapons, nuclear weapons trying to blast a corridor through a city's rings of defenses, and widely dispersed bombers using low-level evasive tactics as they approached their targets.

So the Army drilled Nike crewmen again and again in hopes that they and their missiles would rise to the occasion. It threw simulated crises at them, such as a cutoff of communications between a battery and its AADCP. Air Force bombers did their best to jam the Nike's target-tracking radar. The Army sent evaluation teams to show up at the front gate of Nike bases in the middle of the night. The team would trigger an alert, take

## Los Angeles Defense — January 1961

*Circles: Nike sites that defended the aerospace manufacturing infrastructure in the L.A. area.*

*Boxes/rectangles: Supporting structures without magazines, missiles, or launchers.*




SOURCE: "RINGS OF SUPERSONIC STEEL"

up positions in the launcher and radar complexes, and, as the the battery crew members readied for launch, note every step they took—even their exact words.

All Nike units sent crew members for annual practice at missile-firing ranges in New Mexico, where they worked on tracking and firing at drone aircraft. To keep their equipment and skills sharp, radar operators at some batteries routinely locked their target-tracking radar on passing airliners. A common exercise was "radar bomb scoring," in which Air Force bombers would fly toward a landmark, such as a smokestack, and simulate an attempt to bomb it. Nike batteries would score the bombing runs for accuracy, as well as simulate attempts to shoot the bombers down before they reached the bomb-release point.

In the event of a real attack, the Nike rules of engagement allowed officers considerable freedom of action. According to Dale Nichols, a commander could fire missiles without additional authorization from the AADCP if he saw evidence of hostile nuclear explosions, if the base was under direct attack, or if the radar track of an unidentified airplane showed that it met something called the "pop-up criteria." "That means you exceed Mach 2 and you climb from 2,000 feet to 15,000 feet in less than three minutes," Nichols says. Flying like that would indicate that an attacking aircraft had managed to slip under the radar screen and was about to loft a nuclear bomb toward the target, then make a climbing turn and flee. "Shooting under those conditions was entirely possible," says Nichols, "but only if the missiles were up at the time, and they hardly ever were"; normally, they were kept in the underground magazine.

If a Hercules was launched, the fervent hope was that radiation from its blast would destroy all bombs that were released from the wreckage of an enemy aircraft. Any fireballs created by the Nike warhead's explosion were supposed to occur tens of thousands of feet up. "You didn't want to have the fireball touch the ground," says Frank Evans; such contact might create a mushroom cloud of radioactive fallout. "But there might be decisions to make, say if you had a lot of Russian bombers coming in, not just a couple. You might say 'To hell with it' and accept some fallout. That's if you knew absolutely it was Russians and that they had 25 megatons on board."

**If a Hercules had to be launched, the fervent hope was that radiation from its blast would destroy any bombs carried by an enemy's aircraft. Says Frank Evans: "You didn't want the fireball to touch the ground."**

Under such extreme circumstances, the awful decision to push a button that would override the "minimum burst altitude" setting and thus trigger a nuclear fireball low enough to scorch American soil would have been the missile commander's alone to make.

Was there any threat that justified the huge amounts of money and manpower the United States spent on the Nike and the even more expensive anti-aircraft defenses of the Air Force?

The Nike's primary mission was to shoot down any Soviet aircraft attempting to overfly the United States. *American Aviation* magazine claimed in 1954 that Soviet diesel-engine bombers were already slipping across the western coastline to plan an attack. While no one ever observed such flights, nine years later the Air Force announced that on March 15, 1963, two Soviet jets—probably recon bombers—passed over portions of Alaska.

According to former Nike radar operator Jose Cuyar, Soviet bombers over the north Atlantic would occasionally "shadow" airliners on their way to New York, attempting to merge with the airliner's radar return and thus testing the ability of U.S. radar and interceptors to detect them. Former radar operator Peter De Marco confirms those observations, adding that the Soviets al-

*A different world: For Armed Forces Day in May 1957, the Army proudly exhibited two of its Nikes to the citizens of rocket-friendly Huntsville.*

U.S. ARMY REDSTONE ARSENAL

ways broke off before entering the Eastern Air Defense Identification Zone, where they would have been obligated to file flight plans with U.S. air traffic controllers.

By 1962 the Nike reigned as the last-ditch defense of U.S. cities. Though the Air Force's more complex Bomarc cruise missile was finally in production, it was produced in numbers much smaller than had originally been predicted, and at a cost much higher than promised. The system had lost some Congressional support in 1960 after one Bomarc caught fire in its shelter and scattered a small amount of radioactive plutonium at McGuire Air Force Base in New Jersey.

The Nike had evolved into the innermost ring of a nationwide, integrated, computerized air defense system managed by the Air Force. Nike radar equipment was excellent for its time, according to Peter De Marco, who served as an electronic countermeasures specialist, in addition to his radar work. When he got out of the Army in 1969, he went to work for the Federal Aviation Administration, and he was shocked to see how much more primitive the agency's technology was. The controllers there were still tracking radar blips on flat scopes by sliding around plastic "shrimp boats" labeled with aircraft IDs.

Despite the sophistication of its radar, by around 1965, it was clear that the Nike's *raison d'être*—a swarm of enemy atomic bombers—was a threat whose time had passed. Steve Zaloga, author of *The Kremlin's Nuclear Sword*, says that though the Soviets had indeed once entertained schemes to attack and occupy part of Alaska for use as a forward bomber base, "they never went far. By the time it was feasible for bombers to attack [the U.S.], they were doing serious testing of ICBMs." The Army attempted to develop a nuclear-tipped Nike for destroying intercontinental ballistic missiles, but the project succumbed to technical objections, a desire to slash cold war spending, and finally a treaty banning strategic missile defenses.

What proved to be the Nike's downfall was the Vietnam War. As more and more Army money was diverted to that effort, maintenance at the Nike sites began to suffer. "At the end, it was like plugging holes in a dam," Frank Evans says of his unit, PI-93, northwest of Pittsburgh, Pennsylvania. "We let stuff go as long as we could and then we fixed it."


NASM (SI NEG. #95-8695)

*Meet the Nikes: Ajax, Hercules, and Zeus (left to right). The Zeus, designed to defend against ballistic missiles, was cancelled in 1963.*

Nearly all U.S. Nike bases closed before 1975; Dale Nichols helped shut down his Kansas base. The last operating Nike bases, in Alaska and Florida, closed in 1979. Hundreds of surplus Nike missiles were sold off to allies. Most had spent nearly all their time in their underground bunkers, emerging into sunlight only for maintenance, drills, and alerts. The United States had never launched a single Nike missile against a real or perceived threat. Today, Nikes in good condition are rare beasts, hunted relentlessly by collectors. South Korea still keeps modified Nike Hercules missiles (without the nuclear warheads) on guard near its demilitarized zone.

Most Nike sites have been demolished, at least to the extent that the top slabs of the magazines have been removed and the remaining pits have been filled with rubble from living quarters and other base buildings. Some bases were virtually given away to local governments; Nike Intermediate School is on the site of the base near Gardner, Kansas. Other sites were auctioned off to private buyers. The radar complex for site C-47 in Indiana is used for paintball games, and a relative of mine has one in Kansas City that he uses to store equipment. One buyer converted a launcher complex near Dillsboro, Indiana, to an underground home.

And there are some sites that have been preserved in or restored to their cold war state. One, San Francisco's SF-88, hosts a reunion of Nike personnel every year. Visiting the site summoned vivid memories for Frank Evans. "It all came back—particularly the sounds," he says. "When you walk in, the hydraulic motors sound the same, and there's that sound when the big doors open and come down with a bang."

The site takes pains to give visitors the most realistic Nike site experience possible, even showing the vacuum tubes used in the radar-receiving equipment. On Wednesday through Friday afternoons, SF-88 is open for self-guided tours. On the first Sunday of each month, volunteers hold an open house. On those days, a well-scrubbed Nike Hercules rises from its underground lair and tilts upward on its launcher, as if still ready for the enemy who never showed up.