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Seizing Victory from the Jaws of Deterrence: Preservation and Public Memory of America's Nike Air Defense Missile System

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by

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by

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In the absence of fellowships, scholars rely upon friendships to succeed. To friends and family, archivists and academics, providing shelter and support, victuals and vehicles, understanding and advice to scholars everywhere; to them this work is dedicated with gratitude.

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ABSTRACT

Seizing Victory from the Jaws of Deterrence: Preservation and Public Memory of America's Nike Air Defense Missile System

by

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This dissertation explores the historic preservation and public memory of America's Nike air defense missile program. To defend against nuclear attacks delivered by Soviet bombers in the 1950s, 60s, and 70s the United States constructed a massive air defense network, the largest peacetime dispersion of America's military might into its communities. The 275 Nike sites built in 29 states are one highly representative example of these defenses and constitute the world's first missile base network, predating not only all other air defense missile networks but also all offensive nuclear missile bases.

Despite its tremendous significance, historic preservation and public memory of America's Nike air defense missile system is extremely limited. The dominance of deterrence, lack of trauma associated with Nike sites, and difficulty fitting air defense into traditional narratives of the Cold War provide a poor foundation for public memory. While the many extant Nike sites

generally retain their integrity, or ability to communicate their historical significance, numerous pitfalls hamper Nike preservation efforts, even the five Nike sites listed in the National Register of Historic Places.

Considered in the context of a complex, contradictory Cold War, Nike sites are the quintessential Cold War site. Additionally, Nike sites highlight the way public memory and preservation fuel and feed off of each other. Given the current state of historic preservation and public memory of Nike sites, a three-pronged strategy of interpretation, focused preservation, and a series of markers is the best way to commemorate and educate Americans about the importance once assigned to air defense against nuclear weapons: a menace that continues to threaten our world.

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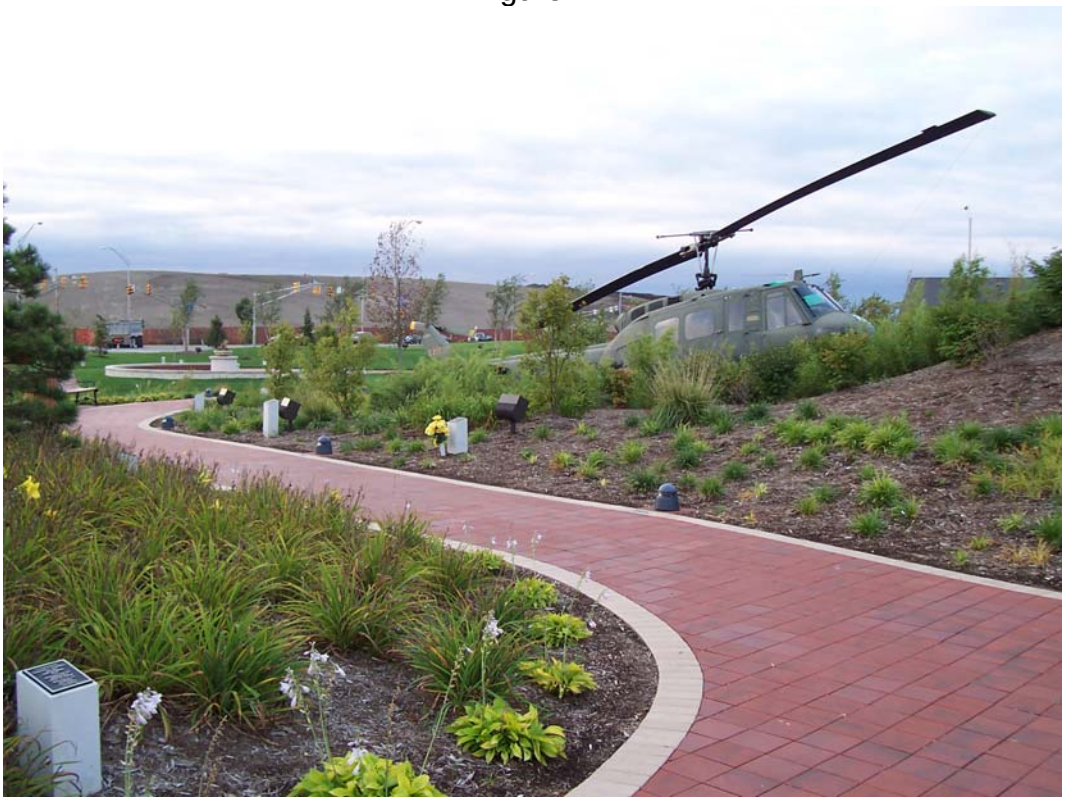
Introduction

Community Veteran's Memorial Park in Munster, Indiana, is an extraordinary sight. Huge bronze sculptures, a helicopter, flags, audio commentary stations, informational plaques, and memorial markers wind around artificial waterways on a meandering, immaculately landscaped pathway bordered by a brick timeline. Here the history of America's twentieth century wars is memorialized in neat, finite blocks. Yet nowhere in this massive memorial is America's Nike air defense missile system mentioned. Even more surprisingly, a considerably intact former Nike air defense missile site that once guarded the community with an arsenal of nuclear[1] tipped missiles remains visible roughly one-third of a mile away. Currently used as an equipment storage yard, the site slowly decays, hidden in plain sight of a dramatic product of public memory.

[1] This work draws no distinctions between the terms "atomic" and "nuclear," since both terms have been used interchangeably by the public for many years. Among physicists, atomic weapons, also known as A-bombs and fission bombs, use fission reactions to produce explosions that, while tremendous, pale in comparison to the power of nuclear weapons. Also known as thermonuclear weapons, hydrogen bombs, H-bombs, and fusion bombs, nuclear weapons rely upon fusion reactions initiated by fission of atomic particles. Even these synonyms generate some confusion, since the term "bomb" technically describes a method of deployment. Bombs are typically dropped from aircraft and possess no independent guidance, whereas missiles, which may or may not have independent guidance systems, may contain atomic/nuclear warheads.

Figure 1



A memorial to twentieth century conflicts in Munster, Indiana that ignores the extant Nike missile site visible from the park
Courtesy of Author

These adjacent sites[2] are highly emblematic of the historic preservation and public memory of America's Nike air defense missile

[2] The National Register of Historic Places recognizes six major categories of historic properties: buildings, structures, objects, sites, districts, and cultural landscapes. Common parlance refers to Nike air defense missile bases as "sites," with each site actually being comprised of three areas/sites/portions referred to in different ways: launch/launcher/launching sites, integrated fire control/radar/battery control sites, and/or administrative/administration sites. Nike "sites" possess many buildings, structures, objects, and sites, as defined by the National Register, thus the National Register would generally categorize them as districts. Outside of

system: a crucial component of the largest peacetime deployment of military might into the United States. Collectively, Americans have almost completely forgotten the enormous significance of the Nike air defense missile system and Cold War air defenses in general, despite the fact that these sites were quite well known when they guarded the nation. When listed in the National Register of Historic Places, these sites usually decay, either unused or harnessed for inappropriate uses. To understand this apparent amnesia, one must seize the Nike air defense missile system, named after the Greek goddess of victory, not from the jaws of defeat, but from the maw of deterrence: the strategy that produced neither victory nor defeat in the Cold War. Deterrence is the dominant military context of the Cold War in the United States. Such a context minimizes public memory of viable air defenses and inhibits their preservation[3], yet deterrence cannot explain this phenomenon completely. Other common Cold War narratives and the lack of trauma and fear associated with Nike bases limit public memory and preservation of these bases. While extant Nike sites generally retain their integrity, certain pitfalls hamper preservation of these ubiquitous and

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National Register nominations, this author has never encountered the term "district" to refer to any collection of Nike properties. In keeping with common parlance and a general desire to avoid repetition, this work uses the term site, base, and installation interchangeably to refer to Nike properties, as well as using other common terms for literary variety (e.g. equipment and objects).

[3] Apart from the section in this introduction that explains the differences in the four methods of historic preservation (preservation, rehabilitation, restoration, and reconstruction), I use the term "preservation" instead of "historic preservation" for literary variety throughout this dissertation.

quintessential Cold War relics. Communicating the significance of Nike sites is best accomplished with a three-part strategy of interpretation, focused preservation, and installation of markers in a manner that preserves the balance between the public memory and historic preservation of these sites.

Figure 2

"Victory" by Frederick MacMonnies, Battle Monument, West Point, New York
Courtesy of H. Dexter Hedstrom

Despite the limited public memory and preservation of Nike sites in the United States today, the Nike's imprint on American society is undoubtedly significant. Chapter 1 explores this significance. America's Cold War air defenses maintained a constant state of vigilance, ready to defend the nation from a nuclear attack that could strike at any moment with little or no warning, thanks to dramatic increases in aircraft and missile technology following World War II. The depth of America's Cold War air defense deployment was tremendous; 275 Nike sites spread across the American countryside complemented 433 fixed radar stations, 17,330 Ground Observer Corps observation posts, over 1,500 fighter interceptor jet aircraft at numerous air bases, and many other air defenses during the Cold War. Every state in the nation was home to at least one fixed air defense installation, be it an air defense missile site, a fighter interceptor base, a radar

station, or a Ground Observer Corps filter center. Twenty-nine of fifty states possessed at least one Nike air defense missile site, the world's first deployed air defense missile system that predated any ballistic missile base network. [4] The Nike air defense missile system made up a crucial part of this defense network: the largest peacetime deployment of military might into the United States. In terms of the numbers of individual bases, the intelligence of the personnel, the cutting-edge military technology, and the way the Nike system pioneered numerous Cold War military practices, America's Nike air defense missile system merits recognition.

The Cold War is characterized by highly significant yet secret sites and operations, and therefore analyses of limited public memory must also

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[4] These include fixed, not mobile, Air Force radar stations. Marine, Navy, and Army stations, though usually in conjunction with some other military function such as attack aircraft or air defense missiles, are not included in this count, nor are Semi-Automatic Ground Environment Direction Centers and other command and control installations designed for the sole purpose of providing air defense. [David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Langley Air Force Base, Virginia: U.S. Air Force, Headquarters Air Combat Command, 1997), 36, 94-170; Denys Volan, *History of the Ground Observer Corps* (Washington: Aerospace Defense Command, Historical Division, Command Directorate of Information, 1968) 226; "Nike and Fighter Cutbacks Ordered," *New York Times*, 4 March 1971, 21; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 451-582; Christine Whitacre, ed. *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31; and David Baker, *The Rocket: The History and Development of Rocket & Missile Technology* (New York: Crown Publishers, 1978) 271.]

consider whether people actually knew about these sites during their operation. In his book *Survival City: Adventures Among the Ruins of Atomic America,* Tom Vanderbilt describes the Cold War landscape as being comprised of resources that could and could not be seen, a "…checkered archipelago of autonomous states."[5] But Nike sites represent more than individual parts of an archipelago, and they could be seen very clearly. Nike air defense missile sites were a uniform, centrally controlled franchise before even McDonald's was known as a franchise. The Nike system utilized franchise-style architecture and operations to deliver a predictable service, easily recognizable regardless of where one traveled in the nation. Though industrial in nature, character-defining features of Nike sites, like massive radomes that covered radar antennae, clearly revealed the presence of these defenses. Furthermore, the American public knew about the Nike air defense missile system during the 1950s, 1960s, and 1970s. In a bid to win support from the American public for its air defense missile system, the Army conducted an extensive public relations campaign in support of the Nike even before constructing missile sites. While it may have known about Nike sites, the public did not always support the placement of these sites in their community. Resistance to the construction of Nike sites further increased public awareness of this Cold War infrastructure. Chapter two demonstrates the extensive public awareness of Nike sites during their operation.

[5] Tom Vanderbilt, *Survival City: Adventures Among the Ruins of Atomic America* (New York: Princeton Architectural Press, 2002) 16-19.

Despite its significance and relatively high profile in Cold War America, public memory of America's Nike air defense missile system remains extremely limited. Chapter three demonstrates this and examines a key product and source of public memory: Nike air defense missile sites deemed worthy of preservation by the National Register of Historic Places.

Public memory consists of collective constructions and representations of the past. Public memory is not stereotype, though like stereotype, public memory is a fluid social construction, and public memory can perpetuate stereotypes. Public memory helps relate and reconcile personal memories with history. Indeed, public memory is the bridge between personal memory and history. This bridge is generally a patchwork of interpretations and constructions, debated between parties and evolving over time. Some scholars, such as Harold Marcuse, assess the public memories of definable groups of people ("memory groups") with common goals, experiences, values, or images of the past.[6] Other scholars, such as Marita Sturken, characterize public memory as the product of collective contestations over the past by all interested groups.[7] Since public memory of the Nike network is not characterized by large contestations over public memory or identifiable

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[6] Harold Marcuse, *Legacies of Dachau: The Uses and Abuses of a Concentration Camp, 1933-2001* (Cambridge: Cambridge University Press, 2001) 14.

[7] Marita Sturken, *Tangled Memories: The Vietnam War, the AIDS Epidemic, and the Politics of Remembering* (Berkeley: The University of California Press, 1997) 1-3.

representations of major memory groups, this dissertation focuses upon its most apparent characteristic: the near absence of these elements.

Scholars employ a variety of terms when referring to public memory. Andreas Huyssen and Marita Sturken study cultural memory. Paul Connerton calls this social memory. Steven Knapp labels the concept collective past. For the purpose of this investigation, I treat public, cultural, social, and collective memory as the same concept.[8]

Scholars agree upon the basic definition of public memory as collective constructions and representations of the past, but beyond that point their theories often diverge. In his definition of public memory, John Bodnar highlights conflicts between official and vernacular forms of representation within political discussions over present concerns.[9] Pierre Nora highlights the way history's production of sites of memory (lieux de mémorie) tend to overwhelm the public memory evident in prehistoric, mutable environments of memory (milieux de mémorie).[10] Marita Sturken takes issue with Nora's depiction of a pure, stable public memory (milieux de mémorie) untainted until

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[8] Andreas Huyssen, *Present Pasts: Urban Palimpsests and the Politics of Memory* (Stanford: Stanford University Press, 2003) 6-7; Marita Sturken, *Tangled Memories: The Vietnam War, the AIDS Epidemic, and the Politics of Remembering* (Berkeley: The University of California Press, 1997) 3; Paul Connerton, *How Societies Remember* (New York: Cambridge University Press, 1989) 71; Steven Knapp, "Collective Memory and the Actual Past," *Representations* 26 (Spring 1989) 124.

[9] John Bodnar, *Remaking America: Public Memory, Commemoration, and Patriotism in the Twentieth Century* (Princeton: Princeton University Press, 1992) 13.

[10] Pierre Nora, "Between Memory and History: Les Lieux de Mémoire," *Representations* 26 (Spring 1989): 7.

the development of history. She sees memory and history as entangled, not oppositional, and notes the centrality of trauma in the production of public memory.[11] This work does not seek to gloss over these differences. By relying upon basic, widely agreed upon definitions of concepts such as public memory and historic preservation, this work seeks to examine the interrelationship between these fields through a case study on a subject with highly limited exposure in all three fields: America's Nike air defense missile system.

Public memory of America's Nike air defense missile system is extremely limited. Comparatively little evidence of public memory of Nike sites can be found in historic sites, monuments, memorials, films, Internet websites, and other public memory products. In such a sparse environment, temporal and spatial changes become difficult to discern. Even the most telling examples elicit few conclusions. Guardian Park at Fort Hancock, New Jersey originally began as a conglomeration of disparate pieces assembled as a monument to honor the service of Nike personnel. Its deterioration and recent restoration, as discussed in chapter three, does not reflect changes in public memory or constituencies so much as it represents the dominance of other public memories and the restorations of previous constructions. The federal government owns all five Nike sites listed in the National Register of

[11] Marita Sturken, *Tangled Memories: The Vietnam War, the AIDS Epidemic, and the Politics of Remembering* (Berkeley: The University of California Press, 1997) 3, 5, 17.

Historic Places. All but one of these nominations were written by governmental employees to comply with federal laws, not as expressions of public memory.[12] Since 1966 the National Historic Preservation Act has required federal agencies fully integrate historic preservation into all of their programs, though not until 1992 were federal agencies specifically mandated to nominate historic properties to the National Register of Historic Places.[13] The nonprofit Nike Preservation Group's nomination of Nike site C-47 in Wheeler, Indiana, fulfilled this mandate for the General Services Administration (GSA), which owns the site. The Nike Preservation Group (NPG) dissolved following the sudden death of the organization's founder and prior to the commencement of any restoration work. Former officials did not return telephone or e-mail inquiries. While the group's newsletters do provide

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[12] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004; National Park Service, *General Management Plan: Gateway National Recreation Area New York/New Jersey* (Washington, D.C.: National Park Service, 1979) 165; Janet Clemens, E-mail to Author, 9 October 2008; John Haller, E-mail to Author, 9 October 2008; Darrell Lewis, E-mail to Author, 9 October 2008; Nancy Russell, E-mail to Author, 21 October 2008.

[13] National Park Service, *The Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act, Published in Final in the Federal Register, 24 April 1998: Section 110 of the National Historic Preservation Act (16 U.S.C. 470)* [http://www.nps.gov/history/hps/fapa_110.htm], accessed 25 October 2008.

insights into public memory of this Nike site, the demise of the organization left little evidence from which to draw significant conclusions about public memory of Nike sites.[14]

This dissertation does not argue that public memory of Nike sites is nonexistent. In his book *Remaking America: Public Memory, Commemoration, & Patriotism in the 20th Century,* John Bodnar segments public memory into official and vernacular forms of representation.[15] Research indicates that both official and vernacular remembrances of Nike sites exist. The federal government owns all five Nike sites listed in the National Register of Historic Places. Numerous Internet websites currently in existence are devoted to Nike sites. Yet none of these sources are purely official or vernacular. The National Park Service relies upon volunteers to maintain the best-preserved Nike site in existence, SF-88, and also produces Nike websites with content sanctioned by the federal government. Dividing these sources into vernacular and official representations and then analyzing their content would probably reveal both spatial and temporal changes, but considered next to the volume and variety of official and vernacular content

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[14] Nike Preservation Group newsletters available online begin in October 1998 and end in October 2001. [Nike Preservation Group, *The NPG News: The Newsletter of the Nike Preservation Group* 1 (October 1998) [http://ed-thelen.org/npg-newsletters.html], accessed 10 April 2006; Nike Preservation Group, *The NPG News: The Newsletter of the Nike Preservation Group* 3 (May 2000) [http://ed-thelen.org/npg-newsletters.html], accessed 10 April 2006.]

[15] John Bodnar, *Remaking America: Public Memory, Commemoration, and Patriotism in the Twentieth Century* (Princeton: Princeton University Press, 1992) 13-14.

generated by related subjects, like the Cold War and deterrence, such analyses are arguably myopic.

While this work does not purport that public memory of these defenses is uniform and unchanging, it also does not seek to draw significant conclusions from the minor differences in public memory exhibited by the few, relatively small groups who collectively remember these sites. Examples of minor differences in public memory include the activities of preservationists at coastal sites like the Fort MacArthur Military Museum in San Pedro, California, whose tours, writings, and exhibits indicate that they remember the Whites Point Nike site in the context of the long history of coastal defenses at this fort. The team that nominated Nike site HM-69 in Homestead, Florida to the National Register of Historic Places positioned that Nike site's role in the Cuban Missile Crisis at the forefront of their argument advocating preservation of the site. Both sites served as part of an air defense network that extended far beyond the coastal approaches to the United States. Both sites defended the nation against aircraft threats, not ships or missiles. Yet the constituencies with these memories (preservationists, primarily) remains small, and interpretations and writings from both sites indicate that they acknowledge the Nike system's genuine purpose. These public memories appear to have become more prominent with efforts to place Whites Point and HM-69 on registers of historic places, yet they clearly pre-date preservation efforts. The extremely few sources of public memory about

these sites do not provide substantial proof of changes in these memories over time, but they do highlight the relative absence of the sites within public memory of the Cold War and nuclear weapons: subjects whose psychological implications have been scrutinized by scholars for years.[16]

Of course, many historians feel the objects of their study have been paid little heed by the American public, but the Nike system commands a long list of superlatives. Whether one thinks of the Nike as a major component of the largest peacetime dispersion of America's military might into the nation's communities, a deployment of more nuclear missiles than the entire American offensive nuclear missile program, or the first missile base network, the Nike's significance makes this limited public memory all the more surprising. How could the Nike not be remembered? Chapters four, five, and six consider the context of Nike air defense missile system history to help explain why public memory of the Nike system is so limited.

Deterrence is the dominant context of the Cold War, yet it was not always that way.[17] Air defense thrived in 1950s and 1960s nuclear defense

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[16] Fort MacArthur Museum Association, "The History of Fort MacArthur: Guardian of Angels Gate," [http://www.ftmac.org/Fmhist.htm], accessed 19 October 2008; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

[17] Examples of the dominance of this context include John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (New York: Oxford University Press, 1982); Martin Walker, *The Cold War: A History,* (New York: Holt, 1994); Michael Kort, *The Columbia Guide to the Cold War* (New York: Columbia University Press, 1998); John Lewis Gaddis, *The Cold War: A New History* (New York: Penguin Press, 2005).

strategy. The shift from air defense to deterrence was so complete that public memory of America's air defenses in general is extremely limited. Deterrence became what Sigmund Freud characterizes as a totem: a symbolic replacement. Totemism is a tool used by leaders to substitute one social model for another. Significant differences between the two situations are minimized by creating a totem, or symbolic substitute.[18] Unable to defend the nation against nuclear weapons, the nation's leaders created a totem: deterrence. Suddenly, the best defense became a good offense.

The rejection of air defense in favor of the deterrent of overwhelming offensive nuclear firepower, exacted a dramatic psychological toll on American society that minimizes public memory of America's Nike system. Countless articles, books, and movies published after World War II illustrate alarming concern over the threat of nuclear war. Popular books and films, such as *Hiroshima, On the Beach,* and *Doctor Strangelove,* depict an increasing fear in American society that peaked once American military and political leaders convinced the American public that there was no viable defense against nuclear weapons. Yet Americans continued functioning rather normally in the face of potential nuclear holocaust. Psychologist Robert Lifton explained this with his theory of "psychic numbing." Employing a combination of classical psychoanalytic defense mechanisms, Americans

[18] *The Basic Writings of Sigmund Freud* ed. trans. A.A. Brill (New York: Random House, 1966) 884-890, 918.

used psychic numbing to create a “numbing of everyday life” that enabled them go about their everyday lives.[19]

Beyond deterrence, historical narratives of the Cold War focus upon other themes not characteristic of the Nike air defense missile system, thus minimizing the Nike’s role in the Cold War. These narratives thrive upon governmental secrets. The Central Intelligence Agency’s (CIA) offshore initiatives, the Federal Bureau of Investigation’s (FBI) domestic surveillance, nuclear nonproliferation, and espionage in general are established features of the Cold War.[20] Nike sites refute this Cold War stereotype. Designed to guard cities, Nike sites could hardly be described as secret. Before the United States engaged in any ideological warfare in Vietnam, winning over the hearts and minds of American citizens concerned about nuclear weapons around their city became a major military mission. Americans had to be convinced that placing defensive nuclear missile bases in their communities brought safety, not danger, during a time of intense fear of nuclear weapons. The public relations campaign for the Nike program alone, which included beauty pageants, parades with inert missiles, community service by soldiers, and regularly scheduled open house events on Nike bases, defies all notions

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[19] Robert Jay Lifton and Richard Falk, *Indefensible Weapons: The Political and Psychological Case Against Nuclearism* (New York: Basic Books, 1982) 103-105.

[20] General and specialized histories that exemplify this include Fred Inglis’ *The Cruel Peace: Everyday Life and the Cold War*, Hugh Wilford’s *The Mighty Wurlitzer: How the CIA Played America,* and Philip Taubman’s *Secret Empire: Eisenhower, the CIA, and the Hidden Story of America’s Space Espionage.*

of Cold War secrecy.[21] To incorporate air defense into Cold War history would refute the notion that the Cold War was top secret.

The Second Red Scare is another common theme in histories of the Cold War.[22] Contrary to narratives that portray 1950s Americans being scared into supporting an over-hyped anti-communist witch hunt, the history of the Nike air defense missile system reveals that Americans were decidedly unbowed by anti-communism. Americans actively opposed the placement of Nike air defense missile sites in their community, frequently for economic reasons rather than concerns over safety. Indeed, Americans opposed sites so vehemently in some cases that the Army subsequently modified Nike plans, indicating a surprising degree of influence on the part of average Americans in shaping America's Cold War defenses. In one instance, public protest over the planned placement of a Nike Ajax site on Los Angeles

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[21] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 103, 318; "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, VI-13.

[22] Examples include Stephen J. Whitfield, *The Culture of the Cold War* (Baltimore: Johns Hopkins University Press, 1991); Martin Walker, *The Cold War: A History,* (New York: Holt, 1994); Michael Kort, *The Columbia Guide to the Cold War* (New York: Columbia University Press, 1998); Ellen Schrecker, *Many Are the Crimes: McCarthyism in America* (Princeton: Princeton University Press, 1998).

International Airport property prompted the Army to select an entirely different site for the base.[23]

Another common element in histories of the Cold War is the significance of the space and missile race.[24] Most narratives depict the Soviet Union as the come-from-behind challenger who leaps ahead of American nuclear know-how by developing the first manmade satellite and the first intercontinental ballistic missile. A Soviet focus on developing ever more massive missiles led to easy adaptation of their missile program to the space race. American achievements with smaller missiles and nuclear weapons like the Nike may have proven more significant in the later years of the Cold War, but these accomplishments have yet to eclipse the historical headlines captured by early Soviet successes in the space and missile race.

These aspects of Cold War narratives transcend the scholarly discourse over Cold War periodization. Nike sites do the same. America's Nike air defenses existed during a period universally accepted as the Cold War: 1954 to 1979. Nike sites neither began nor ended the Cold War. The threat of air-deliverable Soviet weapons existed before and after the Nike era.

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[23] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 192.

[24] Examples include Phillip Taubman, *Secret Empire: Eisenhower, the CIA, and the Hidden Story of America's Space Espionage* (New York: Simon & Schuster, 2003); Martin Walker, The Cold War: A History, (New York: Holt, 1994); Michael Kort, The Columbia Guide to the Cold War (New York: Columbia University Press, 1998).

Rather than challenging the Cold War as a construction or gauging spatial and temporal changes in the collective constructions of the very small constituencies that do remember Nike sites, this study focuses on analyzing and explaining this disproportionately small share of our collective unconscious.[25]

Part of the Nike's low-profile in history has to do with the way its parent organization is perceived in historical narratives of the Cold War. The U.S. Army's legacy during the Cold War is one of savage hand-to-hand fighting far overseas. American technological prowess appears powerless in historical narratives rich with accounts of waves of Chinese soldiers in Korea and savage guerilla tactics in Vietnam.[26] Possession of the atomic bomb made little to no difference in these conflicts, and certainly was never employed. Small wonder that a high-tech homeland defense against nuclear weapons does not occupy more room in narratives of the Army's Cold War

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[25] Periodizing the Cold War has generated substantial discourse. Depending upon the source, the Cold War began with the final events of World War II, Churchill's Iron Curtain speech, the Berlin Blockade, the Soviet crackdown in Czechoslovakia, the Soviet explosion of an atomic bomb, as well as other telling events. The end of the Cold War also is up for debate, with strong positions advocating Hungarian independence, the fall of the Berlin Wall, the reunification of Germany, and the dissolution of the Soviet Union. With the Nike air defense missile program firmly situated in the heart of the Cold War, this dissertation does not engage in such debates.

[26] Perhaps the best of many examples are T.R. Fehrenbach's *This Kind of War: The Classic Korean War History* (Washington, D.C.: Brassey's, 1998) along with Moore and Galloway's *We Were Soldiers Once - and* Young*: Ia Drang, the Battle that Changed the War in Vietnam* (New York: Random House, 1992).

experiences. Chapter five describes the power of these historical narratives and how they inhibit public memory of the Nike system.

The lack of significant physical trauma and fear associated with the sites and the dominance of other traumatic twentieth century military events, such as World War II and Vietnam, also minimizes public memory of America's Nike defenses, as described in chapter six. Although the potential for tremendous devastation is inherent in nuclear weapons bases placed in and around urban areas, the safety record of Nike air defense missile sites is impressive. Even the worst Nike accident and first missile disaster in United States history hardly dented public support for America's Cold War air defense missile bases.[27] On May 22, 1958, Nike site NY-53 in Middletown, New Jersey,[28] just across the harbor from New York City, experienced a devastating accident. When one Ajax warhead detonated during a faulty maintenance procedure, it caused the destruction of seven other Ajax

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[27] "Army Experts at Nike Site: Middletown Disaster Killing 10 First in History of U.S. Missiles," *Newark Evening News*, 23 May 1958.

[28] The Army frequently placed Nike sites on the borders of communities where cheaper land and less dense development existed. Army documents frequently refer to Nike sites using not only a letter/number designation (e.g. NY-53) but also the name of the community in which the site lay. Of course, United States Post office borders do not perfectly conform to political jurisdictions, so a Nike site in one town might have a zip code from another town, leading people to refer to Nike sites by multiple names (e.g. Middletown, New Belford, Leonardo, and Chapel Hill all refer to place names associated with Nike site NY-53). Additionally, the separation required between launch and integrated fire control sites often placed Nike site components in multiple jurisdictions. In the interest of simplicity and literary variety, this work generally identifies Nike sites by their numerical designation and/or one of their place names.

missiles, killed ten men, and sent fragments out in a three-mile radius. Thankfully, the Ajax missile that exploded was non-nuclear, but nuclear Hercules missiles came to the New York Defense Area shortly thereafter.[29] Nevertheless, area residents and Americans in general continued to support the presence of Nike air defense missile sites in their communities. [30]

Although Nike sites did cause some deaths, they never came close to matching the thousands of deaths produced annually by more mundane hazards like vehicle accidents, aircraft crashes, and fires. More violent twentieth-century military conflicts, such as World War II and Vietnam, eclipse public memory of America's Cold War air defenses. These conflicts have produced dramatic, highly tangible products of public memory including memorials and monuments in many American communities. Even the proximity of Nike sites has not improved their rate of preservation, despite being located far closer to American communities than the overseas locations of most historic sites associated with World War II and Vietnam.

Designated historic sites indicate the presence of public memory while simultaneously stimulating greater public memory of the subject they preserve. Speaking epidemiologically, preserved historic sites are both a

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[29] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 380.

[30] "Residents Take Blast in Stride," *Red Bank Register* (New Jersey), 27 May 1958; U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 64.

symptom of and a vector of a communicable, societal syndrome: public memory. The low incidence of preserved Nike sites provides additional evidence of the limited public memory of Nike defenses in the United States. Given this limited public memory, it is unsurprising that few preserved Nike sites exist. This dissertation considers the ways preservation of Nike sites and public memory of this subject affect each other.

Historic preservation is the protection of spaces significant to a shared past. In the field of historic preservation, the foremost rubric for identifying historically significant properties is the system used to nominate resources to the National Register of Historic Places. Created by the National Historic Preservation Act of 1966 and administered by the National Park Service, the National Register of Historic Places stipulates the most widely accepted standards by which properties across the United States are judged to be historically significant. Federal agencies use the National Register standards when conducting investigations required by the National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act. State and local agencies routinely rely upon these standards along with specific state and local standards to judge whether resources within their jurisdictions are historically significant. While they may vary slightly from the National Register, state and local standards typically rely upon the National Register's framework for determining whether something is worthy of preservation; it must be significant within a given context and retain its integrity, defined as its

ability to communicate that significance. History is naturally subjective, yet of all the sub-disciplines within history, historic preservation is perhaps the most objective, thanks to standards such as these.

The near universal acceptance of this benchmark makes it an appropriate framework for this investigation of properties that extended into twenty-nine states and for the analytical approach of this dissertation. The five Nike sites currently listed in the National Register of Historic Places serve as a loose case series, as evidence of both Nike site preservation and public memory. Additionally, this dissertation has been divided into three sections that correspond with the three major eligibility requirements of all properties listed in the National Register: significance, context, and integrity. This rubric is typically relegated to technical evaluations, but it pervades preservationists' thinking about the past. The National Register framework also provides a useful way to ensure that subjects occupying a limited place in public memory are indeed worthy of greater recognition.

No single disciplinary approach can work perfectly for an analysis of both public memory and historic preservation, but this format does help identify the intersections of these disciplines that simultaneously fuel and feed off of each other. Historic preservationists do not directly study cognitive dissonance, totems, or psychic numbing. They do, however, study the context in which resources may be considered significant to people, and these psychological approaches to public memory help explain the context of

the Cold War. Scholars studying public memory do not directly analyze the integrity or character-defining features of historic sites when gauging public memory. They do, however, analyze the way groups preserve historic sites, since such portrayals help identify collective remembrances.

Other widely-recognized preservation standards support the National Register eligibility requirements. The appropriateness of changes to properties designated or eligible for designation on the National Register of Historic Places is governed by *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* and *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*. These standards prioritize the preservation of character-defining features, or aspects of resources essential to communicating the significance of properties.[31] While these are not the only standards or regulatory preservation processes in use, they are the most universally accepted in the United States and the most germane to this analysis.

The Secretary of the Interior's Standards… identify four methods of treating historic properties that are all considered historic preservation.

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[31] Kay D. Weeks and Anne E. Grimmer, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Washington, D.C.: U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, 1995) 19.

Preservation consists of work designed to retain and maintain a large percentage of the materials, form, features, and detailing of historic properties. Rehabilitation includes these goals, with the understanding that changes may need to be made to properties whose use evolves or changes. Restoration is the preservation of extant features, addition of missing features, and removal of anachronistic features from historic properties. Reconstruction consists of re-creating entire resources with new materials when the interpretive value of those resources is extremely high.[32]

The only treatment appropriate for America's Nike air defense missile sites is restoration. When the Army deactivated Nike air defense missile sites, it removed all mobile equipment and most permanent equipment. In addition to removing the missiles, one of the most telltale signs of a Nike site, the Army took more permanent character-defining features, such as the radar dishes and their protective covers, radomes. The absence of these character-defining features limits all preservation efforts to restoration, with the exception of reconstruction, but the very large number of extant Nike sites and the very small number of preserved Nike sites make such an approach inappropriate. The difficulty procuring and restoring nuclear missile site

[32] Kay D. Weeks and Anne E. Grimmer, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Washington, D.C.: U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, 1995) 2.

equipment has limited preservation of Nike sites, and has hindered the sites' ability to communicate their historical significance.

The final section of this dissertation considers the rubric preservationists use to gauge a property's ability to communicate its historical significance: integrity. Given the significance of the Nike air defense missile system, a number of organizations and individuals have advocated preservation of Nike sites as an appropriate way to communicate their importance to our nation. Although a surprisingly large number of these sites remain at least partially intact, preserving former Nike sites has proven difficult. The difficulties inherent in preserving Nike missile sites further inhibits public memory of the Nike system.

Chapter seven considers these difficulties by analyzing the integrity of Nike sites in general. Location, design, setting, materials, workmanship, feeling, and association are the seven aspects of integrity identified by the National Register of Historic Places. By possessing several, and usually most of these aspects, historic resources can communicate their historical significance within a given context.[33] Severe deterioration has affected many extant Nike sites. In general, Nike sites retain their integrity but require careful restoration to fully communicate their significance.

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[33] U.S. Department of the Interior, National Park Service, Cultural Resources, *How to Apply the National Register Criteria for Evaluation* (Washington: U.S. Government Printing Office, 1998) 44-49.

Nike sites are ripe for preservation in a number of ways. Nike sites, located closer to major cities and containing a wider variety of buildings and structures than intercontinental ballistic missile sites, are far better suited for reuse.[34] Additionally, the destruction of Nike sites was not mandated by arms limitation treaties the way intercontinental ballistic missile site destruction was, permitting a higher percentage of Nike sites to continue to exist beyond their life as active defense sites. Nevertheless, owners of Nike sites find themselves navigating numerous preservation pitfalls, detailed in chapter eight.

The Army built Nike sites with "planned obsolescence" in mind. Like much of post-World War II construction, these resources used building materials not intended to last for many years. Yet these resources also used steel and concrete in defensive ways that have made adaptive reuse difficult. Furthermore, contamination related to use by the armed forces mandates environmental cleanup actions. Refurbishing these sites to a state where their equipment works is a highly complex process that requires technical experts to maintain vacuum tube and transistor technology. In most cases, the contractors paid to create and implement this technology have long since abandoned it. This makes maintenance not only difficult but also expensive as the technology becomes harder and harder to procure. Few people apart

[34] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 138.

from veterans of these sites or engineers who built the technology have the expertise to maintain it, even in cases where the federal government has assumed responsibility for preservation.

The best-preserved Nike site, SF-88 in the Golden Gate National Recreation Area near San Francisco, California, is chronically under funded. Since Nike sites were owned and controlled by federal government entities until their reuse in other than military functions, few communities have demanded ownership of the sites in order to preserve them. The few instances in which they are being preserved, most notably at SF-88 and at NY-56 on Fort Hancock, New Jersey, is due largely to the efforts of a strange conglomeration of military veterans, history enthusiasts, and preservationists, according to John Porter and Mary Rasa, the National Park Service personnel assigned to these park sites.[35] The extremely limited preservation of the five Nike sites listed in the National Register of Historic Places indicates that the discipline of historic preservation cannot unilaterally right the historical record and give this highly significant system the exposure it is due. Other disciplines and approaches must come into play.

Few preservationists consider public memory when evaluating potentially historic resources.[36] Indeed, the system established under the

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[35] John Porter, Conversation with Author, 7 October 2005; Mary Rasa, Conversation with Author, 15 June 2005.

[36] I prefer to use the term “historic resource” rather than the term "cultural resource" to describe historically significant properties in general. “Cultural resource” is a term used by many professionals to ensure prehistoric

auspices of the National Register relies upon history, not public memory, to judge the significance of resources. When resources are significant within a given historical context and retain their ability to communicate that significance (i.e. their integrity), they are flagged for preservation. No consideration of the public support for such preservation is given. To the extent that this process seeks to segregate history from nostalgia, this absence is beneficial. Still, by not evaluating public memory to help judge the public mandate for preservation of historic sites, properties can be designated and then not preserved. Even worse, mandating preservation of resources that the public does not collectively remember threatens the mandate for preservation in general.

Only when historic preservation and public memory of a subject are in balance do societies feel they have dealt appropriately with their past.

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resources are considered historically significant and therefore protected by state and federal laws. Unfortunately, the term "cultural resource" means something drastically different to the vast majority of Americans who are not professionals in the fields of historic preservation and cultural resource management. Most people associate it with cultural diversity or the arts. Historians and preservationists need to break down the false dichotomy between historic and prehistoric times. Just because things were not written down does not mean they are not a part of our history. Even this distinction is more a professional that a public one. Thankfully, many of our major preservation organizations and rosters continue to use the term historic, to include state historic preservation offices, tribal historic preservation offices, the National Register of Historic Places (which recognizes prehistoric resources provided they are significant within a historic context and maintain the integrity to communicate that historic significance), the California Historical Resources Commission (which has jurisdiction over prehistoric resources), and the California Register of Historical Resources, to name just a few. For literary variety, this work uses the terms “resource” and “property” interchangeably.

Limited public memory of a particular subject leads to the public perception that historic sites are detached from the experiences of everyday people. At best, the public decries such sites. At worst, they ignore them completely, and the sites slowly fade away. The presence of public memory of a significant topic without historic sites dedicated to that topic generally leaves a void that Americans seek to fill by preserving historic sites. In cases where historic sites are generally unavailable, such as in the case of overseas Vietnam War battlefields, the public often creates monuments and memorials.

The Nike air defense missile system provides an excellent case study for this investigation. Currently, very little public memory of the Nike system exists within American society and extremely few Nike sites have been preserved. Indeed, the Nike system occupies a peculiar void, and through the analysis of this void comes a better understanding of the interrelationship between these fields. This work ends with a chapter devoted to communicating the significance of the Nike system in a manner that maintains a positive balance between historic preservation and public memory.

This analysis concludes that a three-part approach is best for communicating the Nike system's significance. First, historians must interpret the Cold War to give the Nike system the credit it is due. Key to this effort is the acceptance of the Cold War as a conflict of contradictions: cold, yet hot at times; driven by federal fears over a hostile economic and political system yet profoundly affected by the actions and opinions of everyday Americans;

fought at home and overseas; and fueled by the desire to possess technology so destructive that no nation was willing to use it, even during war. In an effort to protect the nation from nuclear weapons, leaders not only abandoned all defenses against nuclear weapons, they actually infused American communities with thousands of these supremely powerful yet incredibly fragile weapons. Within a context of contradictions, the true significance of America's Nike air defense missile system becomes clear.

Interpretations can be tailored to national, state, and local contexts in communities with former Nike sites. Preserving all of those sites, however, is simply unfeasible. Focused preservation of a single Nike site, undertaken by the federal government, should provide the financial resources as well as restoration equipment and expertise required to preserve one representative site well.

In his book *Sense of History: The Place of the Past in American Life* David Glassberg considers historic sites in terms of place and placelessness.[37] Nike sites were placeless, since they often relied upon uniform architecture and layout, yet they were also distinct places. Like franchises, Nike sites were relatively homogenous institutions that did have a particular effect on the space they occupied. Nevertheless, the difficulties inherent in preserving and adaptively reusing Nike sites makes a very focused preservation effort most advisable.

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[37] David Glassberg, *Sense of History: The Place of the Past in American Life* (Amherst: University of Massachusetts Press, 2001) 111-127.

Preserving a community's sense of place is a major reason to preserve local historic sites and a proven method of communicating historical significance, yet not all scholars investigating public memory have advocated preservation of historic sites. Pierre Nora is one of those historians. In his article "Between Memory and History: Les Lieux de Mémoire," Nora states his argument that capitalism, technology, media, and international communication have radically changed societies' memory practices. The proliferation of these things in the world has caused the destruction of *milieux de memoire*, or landscapes/worlds of memory, where the gap between memory and the present was fluid. Memories today are burdened with an overwhelming number of *lieux de memoire*, or sites of memory, some of which are what historic preservationists consider historic sites. These *lieux* have no referent in reality: they are signs historians can decode to investigate a society.[38] Nora's work helps bridge the gap between public memory and historic preservation, and raises important questions about whether preservation will benefit communities or simply add more *lieux de memoire* to an already cramped space in American public memory.

The development of a national network of markers can serve as the bridge between focused preservation of one representative site and interpretive efforts in communities with former Nike sites. The sheer ubiquity

[38] Pierre Nora, "Between Memory and History: Les Lieux de Mémoire," *Representations* 26 (Spring 1989): 7-25.

of these sites is arguably their most powerful aspect. America's Cold War air defense produced thousands of sites in communities in every state in the nation. A national system of markers can prompt consideration of the impact of Nike sites by American leaders and laymen alike, for the threat of air-deliverable nuclear weapons has yet to cease, and Americans must eventually consider substantive safeguards beyond deterrence.

This work extends beyond public memory and preservation of one particular division of Cold War air defense. While America's Cold War air defenses were not all identical, they share the common characteristics that have minimized them in American public memory: lack of incorporation into historical narratives, lack of trauma, and an inability to deal with the dominant feature of the Cold War: intercontinental ballistic missiles. In a broader sense, this investigation can be viewed as a case study for Cold War air defense in general, despite the fact that it does not examine public memory of the Ground Observer Corps, radar stations, anti-ballistic missile systems, or fighter interceptor bases.

The impact of the Nike air defense missile system and America's air defenses in general on Cold War history should be dramatic, once scholars, preservationists, and the American public collectively remember this militarization of American society. Eisenhower's warning about military-industrial complexes should be examined in a new light, given the military-industrial complex that effectively militarized the nation like never before

during his administration. “Massive retaliation” should lose its association with Eisenhower’s New Look, since that deployment was made up mostly of air defenses, and may even become associated with the late Cold War, during which America’s air defenses were abandoned. The nuclear weapons program should be looked at in a new light once Cold War history recognizes the way the Army concentrated short range nuclear weapons in American cities and gave control over these weapons to National Guard troops, civilian contractors, and women. Cold War military history cannot continue to be dominated by the threat of deterrence, proxy wars overseas, and covert activities once the genuine defense, militarization, and openness Nike sites evoked is examined in further depth. Hopefully, public memory and historic preservation, usually excluded from consideration by academic historians, will be increasingly valued as avenues with the potential to yield tremendous insight into our shared past.

Part I

Significance

"To qualify for the National Register [of Historic Places], a property must be significant; that is, it must represent a significant part of the history, architecture, archaeology, engineering, or culture of an area…"

- *How to Apply the National Register Criteria for Evaluation*, page 7

"Cultural [public] memory is a field of cultural negotiation through which different stories vie for a place in history."

- Marita Sturken, *Tangled Memories*, page 1

1 Assessing the Significance of the Nike Air Defense Missile System

Significance is the first question addressed by preservationists when trying to determine whether a property is worthy of preservation. Significance also affects the formation of memory, both public and private. Filtering the myriad sensory perceptions into significant and less than significant inputs enables individuals to focus on what is truly important at any given time. Groups collectively behave in the same manner, thus this inquiry begins with an assessment of the significance of the Nike air defense missile system. Significance alone does not determine a subject's place in public memory. The general public should know about events if they are expected to collectively remember these happenings, thus chapter two examines public awareness of Nike sites during their existence. Chapter three ends this section by investigating public memory of the Nike system in the United States. While preservationists do not normally consider public memory when gauging significance, the public does.

The Nike missile is not historically significant simply due to its designation as a missile. Humans have been firing missiles since the 13th Century when Chinese warriors began firing arrows propelled by black

powder.[1] What makes the Nike important is that it holds the distinctions of being the first guided surface to air missile (SAM) system (Ajax) and the first surface to air nuclear missile system (Hercules).[2] Its widespread use in America's Cold War air defense network makes it even more significant. The Nike air defense missile system was a crucial part of the largest peacetime deployment of military might into the United States ever and pioneered numerous American Cold War military practices.

It is difficult to understate the significance American scientists and military leaders placed upon America's missile program following World War

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[1] There are no universally accepted definitions of missiles or rockets. This work uses the term "missile" to refer to self-propelled projectiles, regardless of their guidance system. Whether describing missiles or rockets, the principles are the same. Self-propelled missiles are reaction devices. Newton's third law of motion states, "For every action there is an equal and opposite reaction." As missiles burn fuel (also known as propellant), the resulting gases find the easiest way to escape the missile by traveling through a nozzle in the tail end of the rocket. Mechanisms housed at this small opening direct the gases that propel the missile. The force of the propellant on the missile is so great that the gases leaving the missile cannot completely dissipate the force. The remaining force is exerted on the missile itself, propelling it forward at an extremely high velocity. Put more simply, the rocket is like a machine gun being fired continuously from the back of a rowboat. The machine gun pushes out bullets the way the rocket pushes out gases resulting from the combustion of its propellant. The recoil from the machine gun moves the boat in roughly the same manner that the "recoil" of the gases escaping the rocket force it forward. [Wernher von Braun and Frederick I. Ordway III, *History of Rocketry & Space Travel*, 3d revised ed. (New York: Thomas Y. Crowell Company, 1975) 22-25.]

[2] The Army activated the first temporary Nike site in the nation at Fort Meade, Maryland in December 1953. The first permanent site opened in Los Angeles a year later. [Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31; "New Atom Missiles Will Guard 4 Areas in Nation this June," *New York Times*, 29 January 1958, 1; Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 417.]

II. Prior to World War II, the United States had no substantive air defenses. Geographic isolation and hemispheric hegemony provided adequate defense. Nations wishing to attack the United States had to project their offensive military power over the ocean. Such operations required years of build-up. World War II changed this situation dramatically. Japanese air power struck a telling blow against America's military forces at Pearl Harbor. The fire bombing of Dresden and Tokyo revealed the shocking power of aircraft and the importance of air defense. Air power also ended the war in a horrifyingly dramatic fashion. Single atomic bombs delivered by two aircraft destroyed two separate Japanese cities. While not producing such dramatic victories, missile technology still held great promise in the minds of scientists and military officials. German V-2 missiles flew undeterred at thousands of miles per hour to strike targets in London and on the European continent.[3]

This wartime aircraft, nuclear, and missile technology changed the American military profoundly. Traditions such as isolationism and a fear of standing armies gave way to a massive American military presence around the globe and at home, of which the Nike air defense missile system was a crucial part. The Nike was also a prominent part of America's Cold War missile program. The eagerness of this program's leaders not only to utilize Nazi expertise but also naturalize and promote former SS members to

[3] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 5.

leadership positions in such a sensitive field remains a surprising segment of Cold War history.[4]

The United States clearly calculated the post-war world in the spring of 1945 when key divisions of the United States Army were issued orders to find not only V-2 missiles but also German missile scientists. The American Army, desiring this expertise, brought a number of these Nazi party members and SS officers back to the United States and eventually naturalized them and their families. So important was this technology that neither the taint of the SS nor the fact that the V-2 was only accurate enough to terrorize and kill European civilians deterred the United States from using this Nazi know-how to boost its burgeoning Cold War missile program.[5]

Not only did American scientists and military leaders harness this knowledge, they sent these former Nazi SS scientist prisoners of war to the very heart of America's nuclear weapons and missile testing program: White Sands Missile Range (then known as White Sands Proving Ground), New Mexico. It was already highly significant, home to America's first nuclear weapons test, Trinity. White Sands was also the birthplace of the first missile designed to defend against nuclear weapons, the Nike Ajax. Nike firing batteries went through their annual training at this very same range. Indeed,

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[4] Ernst Stuhlinger and Frederick I. Ordway III, *Wernher von Braun, Crusader for Space: An Illustrated Memoir* (Malabar, Florida: Krieger Publishing Company, 1994) xiii-xviii.

[5] Ernst Stuhlinger and Frederick I. Ordway III, *Wernher von Braun, Crusader for Space: An Illustrated Memoir* (Malabar, Florida: Krieger Publishing Company, 1994) xiii-xviii.

White Sands was the nation's principle missile and nuclear test site during the 1940s and early 1950s and remains an important missile test facility to this day. These German missile scientists did not develop the Nike system, but their presence at White Sands during this time highlights the urgency and priority placed on America's Cold War missile program, including the Nike.[6]

The Soviet Union demonstrated no qualms in securing all of the Nazi missile technology and scientific expertise it could as well, and used those sources to complement its rapid post-war technological achievements. The explosion of a nuclear device by the Soviet Union in 1949, years ahead of expert's predictions, alarmed American military planners. The realization that the Soviets possessed long-range bombers capable of striking the United States brought about even more anxiety in 1950. At that time America's northern border was less than a twelve-hour flight from the Soviet Union and

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[6] The Redstone surface-to-surface missile, deployed in 1958, became the first full rocket design project for von Braun's team. [Ernst Stuhlinger and Frederick I. Ordway III, *Wernher von Braun, Crusader for Space: An Illustrated Memoir* (Malabar, Florida: Krieger Publishing Company, 1994) 87, 93; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 21, 29; Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 417; Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 175; White Sands Missile Range Museum, "White Sands Missile Range History" [http://www.wsmr-history.org/History.htm], accessed 21 November 2007; White Sands Missile Range, "Testing" [http://www.wsmr.army.mil/capabilities/testing/testing.html], accessed 21 November 2007.]

the United States was engaged in a war against communist forces in Korea.[7] In July 1948, prior to any of these developments, the Air Force had estimated that the United States needed 325 antiaircraft artillery battalions and 83 air defense missile battalions to properly defend the nation. At that time the Army possessed two antiaircraft artillery battalions and no air defense missile battalions.[8] These new developments added urgency and intensity to American air defense efforts.

Just as America had finished downsizing its World War II military, it began constructing an elaborate air defense network, of which the Nike system was a crucial part. This network became the largest peacetime deployment of military might into the United States. Even the proliferation of coastal artillery forts during the late nineteenth to mid twentieth century and the construction of military forts in the American west during the 1800s cannot

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[7] Even greater estimates of Soviet prowess were widespread in popular media. A large article titled “Air Defense of the U.S.” in the January 22,1951 edition of *Life* magazine stated that the USSR had at least 450 TU-4 bombers; was building air bases in eastern Siberia and Murmansk; and could possibly resort to one-way bombing with planes landing in Mexico or soldiers parachuting to prearranged rendezvous with submarines. The article also claimed that Soviet TU-4 bombers could be modified to conduct mid-air refueling operations, but even without mid-air refuels the diagram shows that the vast majority of the United States except the southeast was within the TU-4’s 4,500 mile range. ["Air Defense of the U.S.," *Life* 30 (22 January 1951): 77-89; Vernie-Mae L. Czaky, "Organizational History of the 31st Air Division (Defense), 8 Oct[ober] 1950 - 16 Feb[ruary] 1953." Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 4.]

[8] Robert Kelley, *Army Antiaircraft In Air Defense, 1946 to 1954* (Colorado Springs, Colorado: Headquarters, Air Defense Command, 1954), 46.

compare to America's air defense deployment.[9] America's traditional fear of standing armies disappeared as Americans willingly accepted this massive militarization of their society.

This network relied upon four principal parts: radar; ground observers; air defense artillery and missiles; and fighter-interceptor aircraft. To detect incoming bombers the Air Force embarked upon a massive plan to build a triple line of radar defenses across the United States and Canada. Over the course of the Cold War the Air Force built 433 fixed radar stations in North

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[9] Over seven hundred Cold War air defense bases were constructed in the United States during the 1950s and 1960s. Critics may dispute definitions of peacetime and war, and rightfully so. The very name "Cold War" indicates the presence of conflict, not peace. Still, while the Vietnam War occurred during the late part of this construction, the United States, where these Nike sites were located, was not at war. Although thousands of nineteenth century forts were constructed during America's westward expansion in the nineteenth century, the majority (such as the hundreds of forts built during Florida's Seminole Wars) were constructed during times of active conflict. While more coastal artillery batteries were constructed at certain periods in American history, these batteries could not exist on their own and were closely located around forts where other essential functions took place. Nike sites were far more self-sustaining than these artillery batteries, and each of the 275 Nike sites/bases/posts/installations included two to three separate sites (a launch site, an integrated fire control site, and an administrative site sometimes co-located with the integrated fire control site) located close by each other as well. [Mark A. Berhow, "Modern American Seacoast Defenses: A List of Military Reservations and Concrete Gun Batteries, 1890-1950," Revision Date: October 22, 2006 [http://www.cdsg.org/reprint%20PDFs /CDlist05.pdf], accessed 26 December 2007, 200-229; Robert B. Roberts, *Encyclopedia of Historic Forts: The Military, Pioneer, and Trading Posts of the United States* (New York: Macmillan Publishing Company, 1988) xi-894; Bud Hannings, *Forts of the United States: An Historical Dictionary, 16th Through 19th Centuries* (London: McFarland & Company, 2006) v-738.]

America.[10] Navy aircraft and ships conducted early warning patrols off the coasts of the United States and manned several fixed offshore radar stations.[11] Yet radar alone was not enough to detect Soviet bombers initially.

Early radar technology was not only scarce but also so primitive that aircraft flying below five thousand feet could usually approach radar stations undetected. Terrain obstructions also limited the ability of radar to detect incoming aircraft. While it was still building this radar network the Air Force counted on hundreds of thousands of volunteers in the Ground Observer Corps. The Corps operated during the Cold War from 1950 to 1959.[12] At its apex in 1956 the Ground Observer Corps contained 350,000 volunteers, 17,330 observation posts, and 67 filter centers across the United States. Fifty-six of the filter centers and 889 of the observation posts were on twenty-

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[10] These include fixed, not mobile, Air Force radar stations. Marine, Navy, and Army stations, usually located in conjunction with some other military function such as attack aircraft or air defense missiles, are not included in this count, nor are Semi-Automatic Ground Environment Direction Centers and other command and control installations designed for the sole purpose of providing air defense. [David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Langley Air Force Base, Virginia: U.S. Air Force, Headquarters Air Combat Command, 1997), 36, 94-170.]

[11] Joseph F. Bouchard, Captain, USN, "Guarding the Cold War Ramparts: The U.S. Navy's Role in Continental Air Defense," Naval War College Review 52, no.3 (Summer 1999): 111-135, [http://www.dean-boys.com/551aew/navy_air_defence.htm], accessed 31 January 2004.

[12] An earlier version of the Ground Observer Corps served during World War II. [Denys Volan, *History of the Ground Observer Corps* (Washington: Aerospace Defense Command, Historical Division, Command Directorate of Information, 1968) 106.]

four hour alert status.[13] Volunteers manned observation posts and scanned the skies for aircraft which they then reported to other volunteers in regional filter centers. Filter center volunteers and radar station personnel alerted the Air Force's network of fighter interceptors when detected aircraft could not be identified.

Fighter-interceptor aircraft were the third piece in America's Cold War air defense quartet. Used to both identify and, if necessary, destroy hostile aircraft, fighter-interceptor aircraft proved so flexible they remain in America's air defense arsenal to this day. Fighter interceptor bases dotted the countryside throughout the Cold War. At its peak in the early 1960s the Air Force maintained 1,500 jet interceptors.[14] The Navy also operated ground-based fighter interceptors in smaller numbers.[15] In the event these fighter interceptors were unable to intercept and/or destroy attacking aircraft, one last line of defense lay around selected American cities: air defense artillery and missiles.

Following World War II the Army converted old coastal artillery units into air defense artillery units, knowing full well that such measures could only

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[13] Denys Volan, *History of the Ground Observer Corps* (Washington: Aerospace Defense Command, Historical Division, Command Directorate of Information, 1968) 226.

[14] "Nike and Fighter Cutbacks Ordered," *New York Times*, 4 March 1971, 21.

[15] Joseph F. Bouchard, Captain, USN, "Guarding the Cold War Ramparts: The U.S. Navy's Role in Continental Air Defense," Naval War College Review 52, no.3 (Summer 1999): 111-135, [available online at http://www.dean-boys.com/551aew/navy_air_defence.htm], viewed 31 January 2004.

serve as a temporary defense against aerial bombardment. German jet technology produced aircraft capable of flying 650 miles per hour during World War II. Being 200 miles per hour faster than the propeller driven airplanes that made up the bulk of fighter forces during the war, these aircraft dramatically diminished the capabilities of antiaircraft artillery. Further postwar speed and altitude improvements in jet technology made it possible for Chuck Yeager to break the sound barrier in 1947 and made antiaircraft artillery even less effective. The Army deployed radar guided antiaircraft guns after the war, but even with these developments American antiaircraft defenses had limited effectiveness.[16] A 1951 Army Antiaircraft Command (ARAACOM) report estimated that ten active duty Army gun battalions defending New York City could only expect to destroy 31% of attacking bombers.[17] Air defense missiles improved this effectiveness dramatically.

In February 1945 the Army began Project Nike to develop an air defense missile. Missile technology had improved considerably since its inception in 13th Century China. British forces attacking Fort McHenry during the War of 1812 employed unguided rockets, as noted in the American national anthem. World War II brought extensive use of missiles by many major participants, including the United States, from such simple applications

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[16] United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 2.

[17] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 58.

as the Bazooka to long-range research missiles (sounding rockets) like the Wac Corporal.[18] Not until after World War II, however, did improvements in range and tracking capabilities enable rockets to track and take down high-flying aircraft. The Nike Ajax missile holds the distinction of being the world's first guided surface to air (SAM) missile system.[19] During a time when weather, daylight, and terrain limited the capabilities of all other air defense components (radar, ground observers, and fighter-interceptors), the Nike Ajax provided the only all-weather night interception capabilities in the American air defense arsenal.[20]

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[18] The Star Spangled Banner refers to rockets, which are synonymous with missiles in this dissertation. [David Baker, *The Rocket: The History and Development of Rocket & Missile Technology* (New York: Crown Publishers, 1978) 13, 74.]

[19] Department of Defense, Office of Public Information, “Fact Sheet, Nike Surface to Air Guided Missile,” in “Public Relations-Nike” folder, Box XVIII-34, “Military Missiles and Space,” Military Files, U.S. Army Corps of Engineers Office of History, Fort Belvoir, Virginia, 4; Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31.

[20] Not until the Eleventh Fighter Interceptor Squadron received F102A fighter interceptor jets in 1956 and 1957 did the Air Force have a single all-weather night interceptor squadron in the United States. [Department of Defense, Office of Public Information, “Fact Sheet, Nike Surface to Air Guided Missile,” in “Public Relations-Nike” folder, Box XVIII-34, “Military Missiles and Space,” Military Files, U.S. Army Corps of Engineers Office of History, Fort Belvoir, Virginia, 4; "Historical Record of the 11th Fighter Interceptor Squadron for the Period Ending July 31, 1958," Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 2; Vernie-Mae L. Czaky and A/2C Gene A. Golden, USAF, "Combined History of the 31st Continental Air Defense Division and the 31st Air Division (Defense) January - June 1957," Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 46-48.]

The first missile in the Nike family, the Nike Ajax, was tiny compared to intercontinental ballistic missiles: only twelve inches in diameter and twenty-one or thirty-four feet long, depending upon whether its booster was attached. The first stage liquid fuel booster produced 59,000 pounds of thrust in a mere 2.5 seconds to quickly elevate the 2,455 pound missile before falling back to earth. At that point the missile's engines kicked in. The missile burned a highly toxic mix of jet fuel called JP-4 along with Red Fuming Nitric Acid. Aniline/furfuryl alcohol rounded out this hypergolic (spontaneous ignition upon contact) mix until scientists replaced it with dimethyl hydrazine. The missile engine only sustained flight for up to seventy seconds but while it did, the missile could attain 65,000 feet in altitude, a speed of Mach 2.3 (1,679 miles per hour), and a range of 25-30 miles. A guidance system sent commands to three sets of fins at the fore, middle, and aft of the Ajax to provide steering, sensors, and stability for the missile. Three warheads placed in the nose, center, and tale of the missile exploded on command.[21]

Air defense computers at each Nike missile site worked with the installation's radar to guide Ajax missiles to their targets. Radar tracked the trajectories of the attacking bomber and the missile interceptor, sending this information to a computer that in turn sent an intercept trajectory to the computer inside the missile. The missile's computer translated this trajectory

[21] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31.

into specific directions to the missile's steering fins. Continuous tracking and computer directions slowly brought the two objects to an intercept point at which time the computer inside the missile sent a burst command to the missile's warhead.[22]

These attributes enabled the missile to identify targets 128,000 meters (79.5 miles) distant and launch missiles against aircraft at 75,000 meters (46.6 miles).[23] Once targets moved to within 60,000 feet in elevation (11.36 miles) and 45,700 meters (28.4 miles) ground range away from the launcher, the missile system could destroy bombers flying up to 1,100 miles per hour by exploding within sixty feet of the target.[24]

So powerful and efficient were these missiles that one National Guard source estimated that each was the equivalent of 600 rounds fired at the maximum rate by an entire battalion of sixteen 120 mm (millimeter) antiaircraft guns.[25] Considering that a 120 mm antiaircraft artillery battery with four guns could fire 48 rounds per minute and each Ajax battery had an

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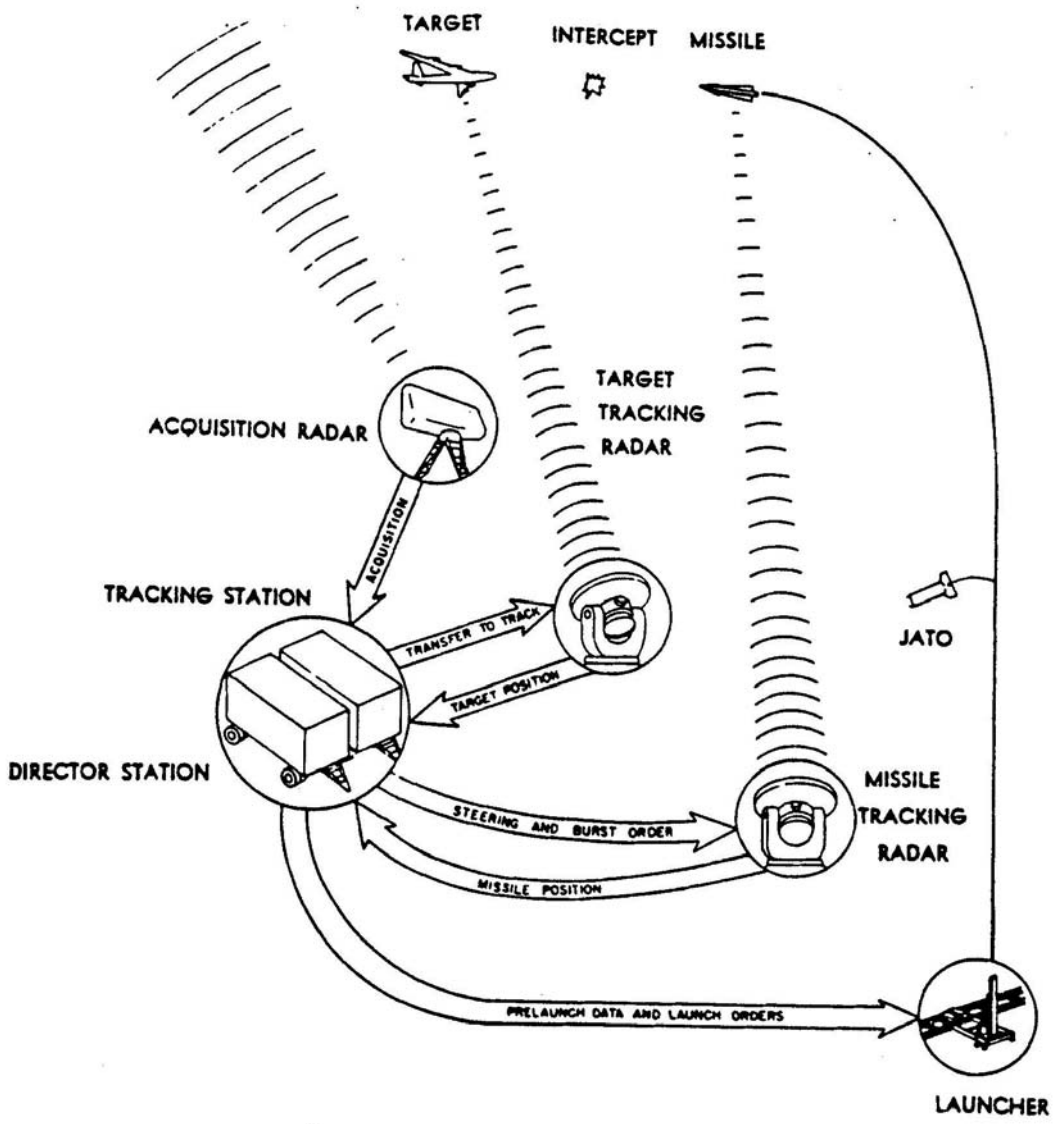
[22] Robert Wells and C.R. Whiting, *Early Warning: Electronic Guardians of Our Country* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962) 62.

[23] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 8-9.

[24] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 3-4, 218.

[25] *Missile Age Minutemen: A Salute Honoring the Army National Guard Air Defense Units, 1954-1974* (Edgewood, Maryland: National Guard Advertising Support Center, 1974) Center for Military History, Washington, D.C., 4.

Figure 3



Basic Nike System Diagram. Subsequent improvements to the Hercules command guidance system changed these components, but the principles of using radar, computers, and missiles to acquire, track, and intercept hostile aircraft remained the same.
Courtesy of U.S. Army

average rate of fire of one missile per minute, this increased efficiency was considerable.[26]

Although the Ajax was far superior to antiaircraft artillery, it had limitations that prompted the Army to work on another air defense missile in 1952, even before the army began deploying the Ajax. The Ajax had difficulty handling mass air attacks. The Ajax's target tracking radar often wandered from aircraft to aircraft when they were flying in close formation. This tendency could have resulted in a miss if the missile passed between aircraft and exploded.[27] The rate of ascent of the Ajax was so great it could not be turned downward after its boost phase too quickly, since the missile could only withstand a stress of 7Gs. This created a parabolic area roughly seven miles in diameter and 25,000 feet high in which the Ajax could not engage and destroy attacking aircraft. With an average rate of fire of approximately one Ajax missile per minute, relatively few high-speed aircraft were required to overwhelm a Nike battery, thus cities were ringed by numbers of these sites. The Ajax had a kill probability of nearly 50%, but in an attack where a

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[26] Robert Kelley, *Army Antiaircraft In Air Defense, 1946 to 1954* (Colorado Springs, Colorado: Headquarters, Air Defense Command, 1954) 93, 100.

[27] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 15-16.

single nuclear bomb could destroy a city, a 50% rate of success was less than ideal.[28]

Thus the Army embarked upon a quest to equip the Nike missile with a nuclear warhead. Short-range defensive missiles equipped with nuclear warheads shed fallout and debris when employed. Placing these around dense urban areas seems ridiculous, until one considers the alternative: Soviet bombers raining nuclear weapons on American communities. Equipping such a missile with a nuclear warhead dramatically improved its chances of destroying not just one but many enemy aircraft in a single blast. The Army also understood that advances in bomber technology necessitated air defense missiles with greater ranges. Testing in the early 1950s demonstrated the Ajax could not handle a nuclear warhead, thus the Army decided to embark upon a new missile, the Hercules - a nuclear air defense missile essentially based upon the Ajax.[29]

Hercules missiles could be equipped with several different nuclear warheads, but this missile was a far more powerful missile than the Ajax in ways beyond nuclear capabilities. First operational in January 1958, the Hercules missile (MIN-14B) had a 10,000 lb booster and could travel at a speed of 4000 miles per hour. The Hercules was designed to explode within

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[28] Robert Kelley, *Army Antiaircraft In Air Defense, 1946 to 1954* (Colorado Springs, Colorado: Headquarters, Air Defense Command, 1954) 93, 96.

[29] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 35, 37.

twenty five to thirty feet of its target.[30] The Hercules could destroy entire formations of closely flying aircraft at a greater distance than the range at which the Ajax could kill individual aircraft. Scientists believed that the nuclear blast of the Hercules would also destroy nuclear weapons aboard those aircraft - something blasts of conventional explosives could not always do.[31] The Hercules could track and successfully engage single targets within mass formations. Army scientists successfully tested this in 1958 and wanted to test the power of a nuclear Hercules warhead on a mass formation, but the Department of the Army unexpectedly cancelled this test.[32] The Hercules could be fired at twice the rate of the Ajax: two missiles per minute.[33] Official Army documents dated June 1967 list the range of the Hercules at over

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[30] There is disagreement as to the exact yield of the Hercules missile's warhead. The W-31 nuclear warhead used by the Hercules had a yield of one to two kilotons according to Chuck Hansen, *U.S. Nuclear Weapons: The Secret History*, (New York: Orion Books, 1988) 187. The Hercules could be equipped with warheads of either two, twenty, or forty kilotons in yield according to other sources such as Thomas B. Cochran, William M. Arkin, and Milton M. Hoenig, *U.S. Nuclear Forces and Capabilities*, Nuclear Weapons Databook (Cambridge, Massachusetts: Ballinger Publishing Company, 1984) 45. The relative significance of the Hercules missile's warhead is not dependent upon its exact yield but that it employed a nuclear warhead and that it had the capability of being equipped with a warhead more powerful than either atomic bomb dropped on Japan during World War II. [James Gibson, *The History of the U.S. Nuclear Arsenal* (Greenwich, Connecticut: Brompton Books Corp., 1989) 172-174.]

[31] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 29.

[32] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 102-103.

[33] Roy S. Barnard, *The History of ARADCOM Vol. 1, The Gun Era 1950-1955* (Headquarters, ARADCOM, Historical Project ARAD 5M-I [no date]), 186.

seventy-five miles and maximum altitude at over 100,000 feet.[34] Other sources list the Nike's range as high as 125 miles. The range of air defense missiles depended upon a variety of factors to include the speed of the target, its altitude, and the way it reflected radar. This makes one exact maximum effective range difficult to calculate.[35] Complicating matters further, Nike Hercules missiles could be fired in one of three modes: surface-to-air, surface-to-surface, and low altitude.[36]

The Army would never confirm or deny the presence of nuclear missiles on Hercules sites. Recent accounts continue to question whether particular Hercules sites ever possessed nuclear missiles. Nevertheless, evidence shows that all Hercules sites clearly held missiles armed with nuclear warheads.[37] An Army Air Defense Command (ARADCOM) report indicates the Army's Continental Air Defense Command (CONAD) and ARADCOM did not approve plans for using high explosive (HE) warheads on

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[34] United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation: The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 13 June 1967), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 4.

[35] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 236.

[36] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 24.

[37] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command*, Vol. I, II, VI (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 16.

the Nike Hercules until August 15, 1961.[38] Once the Army authorized their use, high explosive warheads remained in the minority and strictly a contingency on Nike sites. A June 1967 report by ARADCOM's commander indicated ARADCOM possessed 112 Hercules batteries, all of which contained nuclear warheads. At this time ARADCOM had 1,673 nuclear warheads and 100 non-nuclear high explosive warheads assembled on missiles, with more warheads in reserve. The only reason Nike sites maintained a few Hercules missiles equipped with high explosive warheads in the first place was to provide an opportunity to shoot down Soviet spy planes flying high out of interceptor range without provoking worldwide condemnation over the use of a nuclear weapon. This approach worked well for Soviet air defense forces when they shot down Francis Gary Powers in a U2 spy plane on May 1, 1960, with a non-nuclear air defense missile.[39]

The Nike was far from being the only Cold War air defense missile system in the American inventory, but it was clearly the predominant air defense missile system. Beginning in the late 1940s, each branch of the American armed forces raced to build an air defense missile capable of

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[38] Headquarters, U.S. Army Air Defense Command, "Command Report, U.S. Army Air Defense, 1 Jul - 31 Dec 1961," Center for Military History, Washington, D.C., 17.

[39] United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation : The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 13 June 1967), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 4-5, 70; "Use of Soviet Rocket Seen in Loss of U-2," *New York Times,* 2 November 1962, 1.

chasing and destroying high altitude, supersonic aircraft. The Army won that race in late 1953, developing and fielding the world's first air defense missile system: the Nike Ajax. In 1958 the Nike Hercules, the nuclear upgrade to the Ajax, followed. Between 1954 and 1979 the Army constructed 275 Nike sites in twenty-nine American states. By comparison, the Air Force's largest air defense missile deployment consisted of eight separate BOMARC missile bases in the United States. The Army's second largest air defense missile base deployment in the United States occurred in Florida where ten HAWK (Homing All the Way Killer) missile facilities guarded the Homestead-Miami and Key West Defense Areas. The Navy and Marine Corps fielded a very limited number of Talos and Terrier air defense missiles. None of these systems preceded the Nike's American deployment and none but the HAWK lasted beyond the Nike.[40] Given its longevity and ubiquity, the Nike system clearly qualifies as America's predominant Cold War air defense missile system.

While the Nike system was not cheap, it was cost effective. At peak production Ajax missiles cost $19,300 each and Hercules missiles cost $55,200 each. Experts estimate the Army spent $1.16 billion on the Ajax

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[40] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 24-28, 34, 43-189; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 451-582; and Christine Whitacre, ed. *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31.

system.[41] Yet even at ARADCOM's apex, Nike air defenses remained extremely cost effective. A 1963 review of ARADCOM by the Comptroller of the Army revealed continental air defense used only four cents of every dollar spent on defense. Only 1/8 of that figure was spent on Army air defense, the majority of which represented Nike defenses. ARADCOM's combat forces utilized a mere 3% of the Army's budget and personnel. The report also stated that only deployed forces stood in front of ARADCOM on the Army's priority list for materiel, manpower, and services.[42]

Historical accounts of the Cold War often mention the briefcase perpetually kept by the president, ready for the commander-in-chief to authorize the use of nuclear weapons, if necessary. This "football," as it was nicknamed, symbolizes presidential control over American nuclear weapons, yet this control was far from total. In April 1956, over two years prior to the initial deployment of the Nike Hercules, President Dwight Eisenhower delegated the authority to use nuclear air defense weapons like the Nike

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[41] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 32, 34.

[42] Program Review Division, Office, Director of Review and Analysis, Office, Comptroller of the Army, *Command Analysis, U.S. Army Air Defense Command* (Washington, D.C.: Department of the Army, Office of the Comptroller of the Army, 1963). U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 1.

Hercules to the Air Defense Command if surprise attacks made it unfeasible to wait for a presidential directive.[43]

The significance of this presidential delegation is tremendous. This was not some gradual development in nuclear policy, but a radical departure from what continues to be tight civilian control over nuclear weapons use. Less than two years after deactivating ARADCOM, Department of Defense officials announced that they would revoke this authority from NORAD.[44] Additionally, this decision highlights the variety of air defense commanders charged with the use of nuclear weapons during the Cold War. In a 1958 statement, NORAD commander Earl Partridge boasted to the *New York Times* that his command was the only command authorized to fire nuclear weapons without specific presidential authorization. He even noted that such authorization might come from a lesser-ranked member of his command. Of course, Canadian officials ran NORAD as well. In fact, the position of deputy commander was reserved for a Canadian.[45] Besides foreigners, NORAD commanders in charge of nuclear weapons included very young officers and

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[43] Policy Planning Staff, Department of State, "Authorization for the Expenditure of Nuclear Weapons, 17 January 1957," 4, Policy Planning Staff Records, 1957-1961, Lot 67D548, Box 204, Stelle, C., Chron, General Records of the Department of State, Record Group 59, National Archives at College Park, College Park, MD [http://www.gwu.edu/~nsarchiv/news/predelegation/pd03_01.htm], accessed 12 June 2008; "Air Defense Unit Has No Atom Curb," *New York Times*, 7 October 1958, 11.

[44] " U.S. May Tighten Atomic Control," *New York Times*, 19 March 1976, 1.

[45] "Air Defense Unit Has No Atom Curb," *New York Times*, 7 October 1958, 1.

National Guard personnel commanding Nike sites. At the height of the Vietnam War, which drained ARADCOM of officers, second lieutenants with less than 6 months experience in the Army commanded many of ARADCOM's 112 firing batteries. Fresh out of college, these officers found themselves in charge of eighteen nuclear missiles deployed in and around American cities. Frequently, these men were not even full-time soldiers![46]

One of the most significant elements of the Nike system is the way the Army utilized the National Guard and contracted civilian personnel to defend the United States. Unlike the outsourcing of American military positions in the early twenty-first century, these contractors used nuclear weapons and stood ready in the front lines of America's defenses. The decision to substitute active duty soldiers with civilian contractors and guardsmen was not a momentary aberration in America's defense posture. This ostensibly cost-effective solution existed from the very onset of the Army's Cold War air defenses and continued until nearly the very end of the Nike's watch over the United States.

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[46] It is not known what permissions ARADCOM established for the use of nuclear weapons by battery commanders. [United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation: The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 13 June 1967), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 70; United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation: The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 11 June 1968), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 36, 47.]

The Army federalized Army National Guard (ARNG) antiaircraft artillery battalions when it formed the Army Antiaircraft Command (ARAACOM), the parent organization to North American Nike defenses, on July 1, 1950, just days after the Korean War began. This stopgap measure enabled the Army to rapidly increase its full-time, active duty air defense force. The Army began retiring antiaircraft artillery battalions in 1954 just after activating the first Ajax battery on December 17, 1953.[47] Of course, the Army sought to maintain many of its antiaircraft artillery defenses while the Ajax missile system was still being deployed, thus in 1954 it once again called upon the National Guard to alleviate personnel shortages. This time, the Guard staffed these gun battalions with part-time soldiers, ready to respond quickly when alerted by a core cadre of full-time personnel.[48] By 1955 the Army National Guard operated 50 antiaircraft artillery batteries around the United States.[49]

Ajax missiles became the dominant form of defense in ARAACOM in late 1955 when 140 missile batteries stood ready alongside 132 gun batteries. One year later the Army completed its national deployment of 222

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[47] United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 3, 6.

[48] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 35-37.

[49] *Missile Age Minutemen: A Salute Honoring the Army National Guard Air Defense Units, 1954-1974* (Edgewood, Maryland: National Guard Advertising Support Center, 1974) Center for Military History, Washington, D.C., 2.

Ajax sites.[50] Recognizing the dominance of air defense missiles over antiaircraft artillery and the existence of airborne weapons delivery systems besides aircraft, the Army redesignated ARAACOM. Initially titling it the U.S. Army Air Defense Command (USARADCOM), the Army quickly changed it to the shorter Army Air Defense Command (ARADCOM).[51] ARADCOM deactivated its remaining 120 mm and 90 mm gun units before the year ended.[52] By mid 1958 only two antiaircraft artillery battalions, 75 mm Skysweeper units, remained on active duty.[53]

The end of antiaircraft artillery defenses in ARADCOM did not mean the end of National Guard service. In February 1955 Army Chief of Staff Matthew Ridgeway ordered ARADCOM Commanding General Stanley Mickelson to identify ways to reduce personnel within his command. Ridgeway, former commander of United Nations forces in Korea, made a

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[50] Cagle notes that before the Hercules was deployed, 350 Ajax systems were available for use. Of the two hundred forty six deployed systems, ARADCOM possessed two hundred twenty two. Twenty-four guarded areas overseas. The remaining 104 were under repair, reserved for emergency use, employed in training, and located at a few Air Force bases. [Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 200-202.]

[51] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 1.

[52] United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 12.

[53] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 8.

recommendation that presaged the heavy use of defense contractors by the United States military in the early 21st century. He suggested ARADCOM reduce personnel demands by hiring not only more civilian personnel but also hiring civilian contractors for use in Nike missile batteries that might experience combat. Mickelson did not go so far, feeling the sixty to eighty hour work weeks these air defense units kept would drive a rift between soldiers forced to work those hours and civilians limited to normal work weeks and overtime rules. Mickelson did bring up the idea of using the National Guard and Reserve, though he clearly preferred having full-time air defense units manning ARADCOM sites.[54]

In the end, a combination of both proposals prevailed. In 1957 the Department of the Army completed its active duty Army conversion to Ajax missiles, cancelled the Guard's gun program, and began converting Army National Guard gun units to missile battalions equipped with the Nike Ajax. After a successful test in 1957, the Department of the Army authorized Ajax battalions staffed by National Guard personnel and civilian technicians. Regulations required these technicians also be members of the National Guard in varying officer and enlisted ranks. They worked full time, maintaining the missiles and watching over their Nike sites, ready to alert their

[54] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 73-75.

part-time compatriots to duty.[55] The National Guard and its civilian contractors finished their conversion to Ajax missiles before the end of 1961, taking over seventy-six Ajax sites. By this time all active duty Nike units used Hercules missiles.[56]

In 1958 active duty Nike units began converting to the Hercules system.[57] As with the demise of antiaircraft artillery defenses in the active duty Army, the end of Ajax defenses did not mean the end of the Guard in ARADCOM. By the early 1960s, the possibility of deploying an anti-ballistic missile, the Nike Zeus, seemed near, and the Army needed to free up active duty personnel to run this advanced weapon system. Additionally, President John F. Kennedy's decision to deploy 7,000 military advisors to Vietnam in early 1961 appeared to target ARADCOM for those personnel. ARADCOM leaders knew that if they wanted to maintain a homeland air defense, they would need to think creatively. ARADCOM's closure of Ajax units, which no longer met ARADCOM's standards for defense, might have left thousands of technicians without a job. Hercules sites, which required approximately twice the number of active duty technicians, could provide new homes for all of

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[55] Timothy Osato, “Militia Missilemen: The Army National Guard in Air Defense, 1951-1967” (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 63, 76-77, 277.

[56] Timothy Osato, “Militia Missilemen: The Army National Guard in Air Defense, 1951-1967” (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 99, 140-142.

[57] Timothy Osato, “Militia Missilemen: The Army National Guard in Air Defense, 1951-1967” (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 99, 140-142.

these guardsmen. In the end ARADCOM recommended the Army National Guard man thirty-eight batteries of Hercules missiles, thanks in part to the political clout of their state representatives.[58] In December 1962 the Guard began converting all remaining Ajax sites to Hercules missile sites.[59] In 1963 the command reached its apex for Hercules missiles with 134 firing batteries.[60] ARADCOM retired the last Ajax missile in use by the Guard on May 18, 1964, and finished its Hercules conversion in April 1965.[61]

ARADCOM did not take this step lightly. The increased security and political sensitivity of nuclear missiles like the Hercules caused both the commanding general of ARADCOM and the Army Chief of Staff in 1959 to express deep concern over the use of National Guard troops in these defenses. Time proved their fears to be unfounded. Although fewer in number and technically manned by “part-time” troops, in many ways Army National Guard batteries were easier to manage than active duty Nike

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[58] Timothy Osato, “Militia Missilemen: The Army National Guard in Air Defense, 1951-1967” (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 101-102, 104-105.

[59] Timothy Osato, “Militia Missilemen: The Army National Guard in Air Defense, 1951-1967” (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 99, 140-142.

[60] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 1.

[61] "A Farewell Salute," The National Guardsman (November 1974) 8; Timothy Osato, “Militia Missilemen: The Army National Guard in Air Defense, 1951-1967” (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 99, 140-142.

batteries. ARADCOM had fewer problems manning sites run by the Army National Guard because the active duty Army frequently took experienced ARADCOM men and sent them to Vietnam. A 1968 analysis of the Guard's effectiveness in air defense praised the Guard's performance and found active duty Army Nike units bested their Guard counterparts in few areas, logistics being the primary example. With fewer transfers than active duty Army, the Guard possessed the significant advantage of personnel stability.[62] By this time ARADCOM's commander, Lieutenant General Robert Hackett, fully advocated transferring Nike units to the Guard.[63]

ARADCOM's reliance upon military contractors and Guard troops provided significant savings to the Department of the Army. A 1967 ARADCOM study estimated the Army spent $1,583,000 annually on average for every active duty Hercules battery and $212,000 less for guard batteries, a savings of over 13%.[64] More significant than any fiscal benefit was the increased manpower made available by this move. In 1959 the Army calculated it that it saved 8,836 personnel slots by using ARADCOM

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[62] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 100-101, 180, 184.

[63] United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation: The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 11 June 1968), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 44.

[64] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 97, 99, 115, 220-221.

technicians, effectively increasing the size of the Army without exceeding the New Look imposed fifteen division limit. By 1960 full-time technicians occupied 204 slots in National Guard Nike battalions: nearly 44% of the 465 soldiers required in active duty battalions.[65]

Figure 4

"It's cheaper for the Army because there are no fringe benefits for civilian employees. An Army private gets $78 a month and a beginner here gets about $400. But the hidden costs are eliminated and the Army saves about 50 percent. There are no commissary privileges, full-scale medical programs, quarters allowances, or retirement plans for the civilians."

– An Army officer explaining the rationale behind outsourcing Nike air defense jobs to civilian contractors in 1961.
San Francisco Examiner, 24 December 1961

As the Vietnam War sapped active duty personnel from continental defense forces like ARADCOM, the role of civilian contractors and National Guard troops in ARADCOM increased. In 1967 the Army National Guard ran 48, or nearly 43%, of the 112 Nike Hercules missile units guarding major American cities.[66] The high water mark for the Guard came in January 1969. Fifty-four Army National Guard Nike Hercules firing batteries in seventeen

[65] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 97, 99, 115, 220-221.

[66] United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation: The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 13 June 1967), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 10.

states guarded sixteen cities. This comprised three-fifths of ARADCOM's eighty-seven Nike firing batteries in the contiguous United States and every Nike unit in Hawaii.[67] All told, seventeen states supplied Guard forces for the Nike program, fielding thirty-four battalions and guarding seventeen defense areas.[68]

There is no precedent for what ended up in some cases being a twenty-year activation of this militia for defense of the United States during peacetime. Here the responsibility of the Guard for the nation's defense reached its zenith. State personnel at these sites were assigned direct responsibility for the safety, maintenance, storage, and security of nuclear weapons.[69] At no other time, nor for any longer period of time, has the country assigned the National Guard greater responsibility for the national defense, and these units performed extremely well. One Guard unit holds the distinction of being the only Hercules battery to fire perfect scores in succeeding years at Annual Service Practice, the annual live-fire training completed by all Nike units at White Sands Missile Range, New Mexico.

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[67] *Missile Age Minutemen: A Salute Honoring the Army National Guard Air Defense Units, 1954-1974* (Edgewood, Maryland: National Guard Advertising Support Center, 1974) Center for Military History, Washington, D.C., 4; Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 34.

[68] "A Farewell Salute," *The National Guardsman* (November 1974) 6.

[69] While the National Guard was tapped for antiaircraft duty in the United States in 1940, their deployment did not actually begin until after Japan attacked Pearl Harbor. [Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 5, 108.]

Additionally, Guard units were responsible for eleven of the only thirteen perfect Hercules Annual Service Practice (ASP) firing scores in the contiguous United States.[70]

The Nike system is also significant in the way it helped bring about dramatic advancements in women's rights in the United States during the first half of the Cold War. Initially, women were extremely rare in ARADCOM, as they were in all combat oriented sectors of the Army, and their status in Nike units was correspondingly low. Master Sergeant Ada T. Brackbill holds the distinction of being the first female member of the Women's Army Corps (WAC) assigned to ARADCOM. At that time, all women in the Army were segregated into this all-female auxiliary unit. Assigned on November 21, 1955, Brackbill immediately joined the ARADCOM adjutant general's office and thereby remained about as far from a Nike firing battery as possible while still being assigned to ARADCOM.[71] The number of women in ARADCOM grew, as did their responsibilities. By May 1958, ARADCOM possessed one hundred WAC officers, noncommissioned officers, and enlisted personnel working as stenographers, clerks, teletype operators, message center chiefs, cryptographers, and Missile Master system personnel. As in all combat

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[70] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 2.

[71] United States Army Air Defense Command, "Women Share ADARCOM Jobs," *ARADCOM Argus* (February 1958) 5.

oriented sectors of the United States military, women were notably absent from Nike firing batteries, but this was not a foregone conclusion.[72] In January 1951 General Lawton Collins, Chief of Staff of the Army, ordered his chief of operations, General Maxwell Taylor, to study the adaptation of National Guard units for antiaircraft duty in the United States. Taylor recommended, and Collins concurred, that using Women's Army Corps personnel for such antiaircraft duty would be appropriate. Why it took over twenty years for this idea to gain acceptance is unknown.[73] It was not the first time the Army had considered such an option. WAC personnel staffed an antiaircraft artillery battalion located around Washington, D.C during World War II. Despite a glowing report from their commander at the end of what the Army considered an experiment, the Army Chief of Staff elected to continue relegating women to administrative and logistical roles.[74]

Nike units correspondingly operated like stereotypical all-male organizations during the 1960s. A number of Nike units held beauty pageants for young ladies. Throughout its history ARADCOM's official periodical, the *ARADCOM Argus,* included pin up photos of women in swimsuits or other

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[72] United States Army Air Defense Command, "WACs Around the World," *ARADCOM Argus* (June 1958) 7; United States Army Air Defense Command, "Women Share ADARCOM Jobs," *ARADCOM Argus* (February 1958) 5.

[73] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 15, 21.

[74] Bettie J. Morden, *The Women's Army Corps, 1945-1978* (Washington, D.C.: Center of Military History, United States Army, 1990) 20.

revealing attire. As late as 1969, Army policy dictated single officers live in bachelor officers' quarters (BOQs), mandated the employment of maids, and restricted visitations of female guests.[75]

Figure 5

WAC Private Mary Webster's first meal in the mess hall after reporting for duty at Headquarters Battery, 30th Air Defense Artillery Group, Fort Barry, California in late 1958. Although the Army integrated women into Nike units beginning in the mid 1950s, it took nearly twenty years before all Nike positions were open to females.
Courtesy of U.S. Army

ARADCOM greatly expanded women's roles during the Nike's final years. The Army decided to open up combat branches to women in 1973 and Air Defense Artillery, the branch of Nike air defense missile officers, became

[75] Headquarters, United States Army Air Defense Command, *Junior Officers Retention Study* (1969), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, B-3.

the first to permit women in its ranks.[76] In late 1973 First Lieutenant Susan Cheney became the first female Air Defense Artillery officer assigned to a Nike firing battery.[77] During a time when small arms training was still optional for female Army personnel, the Army assigned women to nuclear missile sites, nearly five years before the Air Force assigned the first woman to an intercontinental ballistic missile site in 1978.[78]

Around the same time women began arriving in Nike firing batteries, ARADCOM began employing human relations officers whose duties included dispelling myths about women.[79] By 1974 pictures and articles of male and female soldiers dating and marrying appeared in *ARADCOM Argus*, as did signs of feminism. One soldier requested a female non-commissioned officer read the oath at a reenlistment ceremony. Honor rolls in this official periodical also indicate females winning Soldier of the Quarter awards and commendation medals. One of the few memorials to Nike personnel,

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[76] Susan Cheney, Interview by John Martini, 9 May 1993, Interview GOGA-18808, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 2.

[77] United States Army Air Defense Command, "First WAC at ADA officer's course," *ARADCOM Argus* (August 1973) 26.

[78] Prior to 1975 women could opt to fire weapons in Basic Training unless they chose to serve in a non-combat position that required small arms use like the Military Police. [Bettie J. Morden, *The Women's Army Corps, 1945-1978* (Washington, D.C.: Center of Military History, United States Army, 1990) 14, 271, 353, 362; United States Army, "Women in the U.S. Army: WWII – New Era," [http://www.army.mil/ women/newera.html], accessed 19 August 2008; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 102.]

[79] *Nike Sagebrush*, March-April 1974, 8.

Figure 6

Dorothy Hitchcock working on the Range Height Indicator at Fort Lawton, Washington's Missile Master, April 11, 1961. Initially relegated to staff duty, the Army expanded women's roles in America's Nike air defenses to control center operations and firing battery duty. This progression toward more complex, combat-oriented work involving nuclear weapons predates similar advancements in other branches of the armed forces and highlights related developments in American society.
Courtesy of U.S. Army

Guardian Park in Sandy Hook, New Jersey, has no plaque honoring either the air defense artillery group or the three battalions who dedicated the park on their deactivation in 1974. Additionally, it does not note that units of the active duty Army, New York Army National Guard, and New Jersey Army National Guard participated in this joint defense. The park does, however,

acknowledge the contributions of female Nike soldiers who guarded that defense area.[80]

The Nike represents significant milestones in missile history in general. The Nike was the world's first deployed air defense missile system and also predated any ballistic missile base network.[81] The firing of a Nike Hercules missile equipped with a W-31 nuclear warhead on Johnston Island on November 4, 1962 concluded America's atmospheric nuclear tests.[82] The Nike system pioneered the underground storage of nuclear missiles, building what would eventually become Nike Hercules missile magazines seven years before the first underground storage facility for an American intercontinental ballistic missile was built.[83] Soldiers launched Nike missiles by "pushing the button," the stereotypical way people refer to the launching of intercontinental

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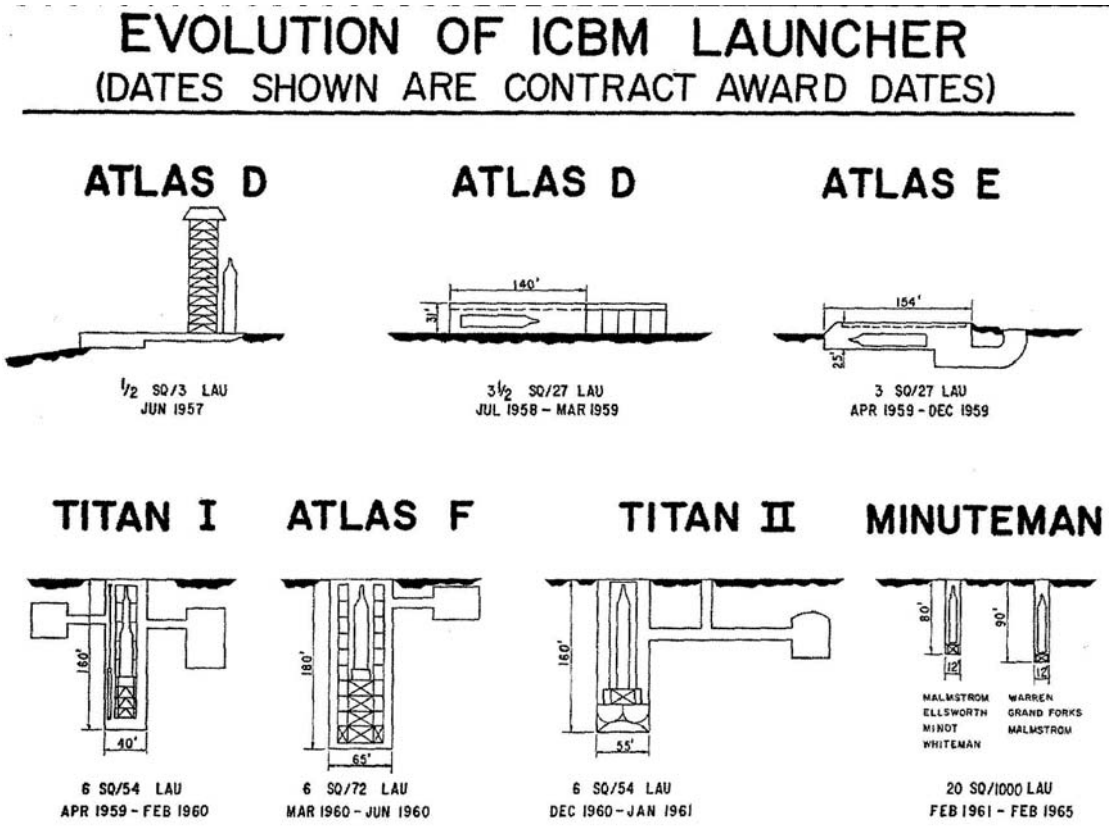
[80] Erin Biddinger, "Guardian Park: A History, 1970-2003," Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 1-2.

[81] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 451-582; Christine Whitacre, ed. *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31; and David Baker, *The Rocket: The History and Development of Rocket & Missile Technology* (New York: Crown Publishers, 1978) 271.

[82] Defense Nuclear Agency, *Operation Dominic I: United States Atmospheric Nuclear Weapons Tests Nuclear Test Personnel Review* (Washington, D.C.: Defense Nuclear Agency, 1983) 247-251, 271-272.

[83] An entire wing of 150 Minuteman intercontinental ballistic missiles only required 30 personnel in underground silos tending the missiles. [John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the*

Figure 7



Underground storage is considered a hallmark of intercontinental ballistic missiles, but Nike air defense missiles predated even the earliest subterranean Intercontinental ballistic missile (ICBM) installation.
Courtesy of National Air and Space Museum

ballistic missiles, which personnel actually launched by turning keys.[84] The Nike also holds the dubious distinction of being the first missile disaster in

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United States Cold War Missile Program (Rock Island, Illinois: Defense Publishing Service, 1996) 80, 102, 216.]

[84] Both Hercules missiles and intercontinental ballistic missiles required codes to ensure the launch command was given by the appropriate authority. Two different groups of personnel maintained those codes and two individuals

United States history, thanks to an Ajax missile explosion in Middletown, New Jersey that killed ten men on May 22, 1958.[85]

Additionally, Nike sites were a crucial part of America's nuclear weapons buildup. A Brookings Institution study estimated the cost of the Cold War nuclear weapons development program alone was over $5.5 trillion. This makes the Cold War nuclear weapons development program the most expensive military undertaking ever.[86] The Nike's role in that buildup was especially significant. Between 1958 and 1960, the height of Nike Hercules missile deployment, the American nuclear arsenal tripled, jumping in size from six thousand to eighteen thousand nuclear warheads in just two years.[87] While the United States had more intercontinental ballistic missile (ICBM) sites than Nike Hercules sites, these 1,200 ICBM sites contained far fewer (usually one) nuclear missiles than Hercules sites, existed in only 17 states, and generally occupied positions in very remote areas around only 22 military bases, not cities. Considering the average number of Hercules missiles on each site, the entire American ICBM program brought fewer nuclear missiles

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had to actually launch the missile. [Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 33.]

[85] "Army Experts at Nike Site: Middletown Disaster Killing 10 First in History of U.S. Missiles," *Newark Evening News*, 23 May 1958.

[86] Tom Vanderbilt, *Survival City: Adventures Among the Ruins of Atomic America* (New York: Princeton Architectural Press, 2002) 14.

[87] David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945-1960," *International Security* 7 (Spring 1983): 66.

to America's communities than the Hercules program *alone*. The Hercules, still used by allied forces in the Republic of Korea, has been in use longer than any American ICBM.[88]

In 1957 the Soviets launched a long-range ballistic missile and the first satellite, Sputnik. Air defenses oriented toward aircraft began to seem less important than ballistic missile defenses, especially since air defense sites were not designed to withstand ballistic missile attacks. The Army did try to modify the Nike system to defend against ballistic missiles. The failed Nike Zeus anti-ballistic missile (ABM) program led to repeated efforts to develop an American anti-ballistic missile system: Nike X, Sentinel, and Safeguard.[89]

Both the Soviet Union and the United States eventually abandoned the idea of developing a comprehensive anti-ballistic missile system. In 1972 both nations signed the Anti-Ballistic Missile Treaty limiting the United States and Soviet Union to two anti-ballistic missile sites each.[90] After years of

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[88] Fighter-interceptor units began using nuclear missiles in the late 1950s. Virtually ignored by the public, this deployment spread as many and possibly more nuclear missiles to America's communities than the Nike Hercules air defense missile system, though the air bases at which these missiles were stored numbered far fewer than America's Nike sites. [John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 6, 570-582.]

[89] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 29-33.

[90] *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems*, May 26, 1972 [http://www.fas.org/nuke/control/abmt/ text/abm2.htm], accessed 21 August 2008.

experimentation, the military activated one Safeguard site just north of Grand Forks, North Dakota. By this time scientists realized the technology of the day made anti-ballistic missile defenses counterproductive. Offensive nuclear missiles were cheaper to produce and more flexible to use than defensive missile systems. The presence of anti-ballistic missile defenses ensured a Soviet attack would send extra missiles to overwhelm anti-ballistic missile defenses. The defenses might work, but the Soviets could theoretically produce and fire enough offensive missiles to ensure the defenses and the resources they protected were eventually destroyed. The tremendous power of atomic weapons seemed to require nothing less than a perfect air defense in the minds of some strategists, since the failure to intercept even one nuclear weapon would have devastating results. Congress ordered the Safeguard site closed the day after the Army declared it operational on October 1, 1975. Officials felt that one site offered too little protection to merit continued operation and the phased-array radar employed by the site seemed too vulnerable to nuclear attack.[91]

The same logic caused military planners to close nearly all Nike air defense missile sites in the United States by the end of 1974. Only sites in Alaska and Florida remained open and then only until 1979.[92]

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[91] James Gibson, *The History of the U.S. Nuclear Arsenal* (Greenwich, Connecticut: Brompton Books Corp., 1989), 168-172.

[92] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 34, 36.

Relative to America's other air defense systems and Cold War technology in general, the Nike network endured. In existence for twenty years, the Nike lasted far longer than the Ground Observer Corps, which did not last a decade, and dramatically longer than America's single ABM site, ordered closed the day after it was declared operational. Nike sites lasted nearly as long as America's Cold War radar network, which ballooned at over four hundred stations and rapidly shrunk to a few stations designed to detect objects entering earth's atmosphere over the entire United States.[93] America's fighter-interceptor force thrived beyond the Cold War, but only by being drastically reduced and reshaped for new missions. Additionally, much of that longevity came from massive investments designed to keep this interceptor force current. From December of 1945 to 1962, the time during which the Army developed and fielded its two Nike air defense missiles, the Air Force fielded eight new jet interceptors.[94]

Significance alone does not determine the place of a nuclear air defense missile system in public memory, but it does help identify what the

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[93] Denys Volan, *History of the Ground Observer Corps* (Washington: Aerospace Defense Command, Historical Division, Command Directorate of Information, 1968) 106; David F. Winkler, *Searching the Skies: The Legacy of the United States Cold War Defense Radar Program* (Langley Air Force Base, Virginia: U.S. Air Force, Headquarters Air Combat Command, 1997), 36, 94-170; James Gibson, *History of the U.S. Nuclear Arsenal*, 168-172.

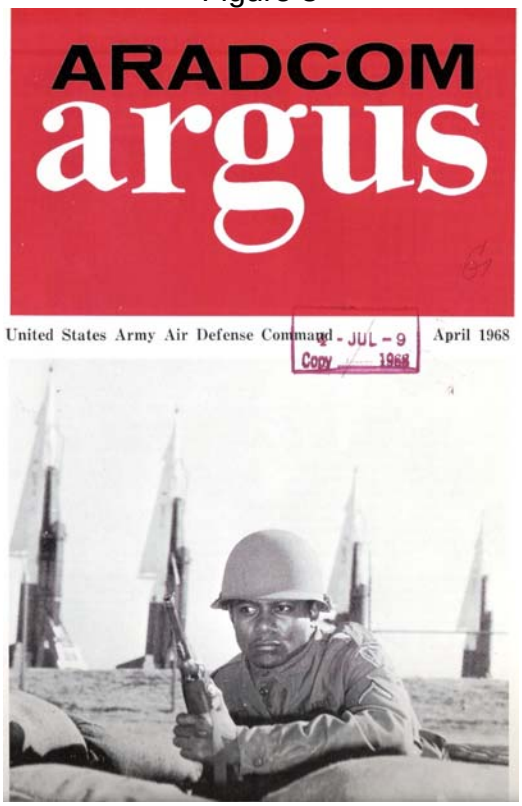
[94] Those were the F-80 Shooting Star, F-86 Sabre Jet, F-89 Scorpion, F-94 Starfire, F-101 Voodoo, F-102 Delta Dagger, F-104 Starfighter, and F-106 Delta Dart. All had multiple variations that permitted them to be used in other roles as well. [Andrew W. Waters, *All the U.S. Air Force Airplanes, 1907-1983* (New York: Hippocrene Books, 1983) 176-191.]

public memory and historic preservation of such a system should revolve around. To hold a place in public memory, the general public should have been aware that this system existed during its time of operation. The Nike air defense missile system was far from clandestine, as the next chapter reveals.

2 Public Awareness of the Nike Air Defense Missile System

In February 1958 ARADCOM began publishing a monthly magazine titled the *ARADCOM Argus* designed to disseminate information and highlight achievements throughout the command. Argus was an ever vigilant, hundred-eyed guardian in Greek mythology. This was certainly an apt analogy for the Nike air defense missile system, whose watchfulness protected American cities from nuclear attack. It also represented the extent to which the military's vigilant watch extended into more American communities than

Figure 8



April 1968 cover of *ARADCOM Argus*. Named after the all-seeing Greek god, Argus, ARADCOM's official periodical alludes not only to Nike soldiers' vigilance but also to the Nike's role in the largest peacetime dispersion of America's military might into her communities. Constructed during a time when the Army's integration exceeded the level of racial integration in many communities, Nike sites also served as a very apparent vanguard of a developing federal commitment to racial equality.
Courtesy of U.S. Army

during any other period of peace in American history, thanks to America's Cold War air defense bases. With 275 Nike sites dedicated to defending America's most populous cities, there was no way the government could hide these military posts from the American public, nor did they attempt to do so.[1] Contrary to stereotypes that portray all Cold War bases as hidden and secretive, Americans definitely knew about America's Nike air defenses not only while but also before the bases existed.[2]

The geographic spread of Nike bases and their locations within heavily populated areas made Nike bases a feature of many communities. With forty-one defense areas covering an even greater number of major cities and military installations, Nike air defense missile bases existed in more than half of all American states. Considering the area these sites could defend, their

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[1] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 451-582; Christine Whitacre, ed. *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31.

[2] Many films and popular print media have helped establish this stereotype, even while evidence points to the contrary. One good example is a 1998 Scripps Howard News Service article "Keeping it Secret: Bases Busy in Post-Cold War Era." The author, Thomas Hargrove, describes Cold War installations that, despite job cuts, continue to employ tens of thousands of workers, many of whom are non-government workers. Obviously, bases employing large numbers of workers are no secret, especially when staffed by non-government workers. (Thomas Hargrove, "Keeping it Secret: Bases Busy in Post-Cold War Era," *European Stars and Stripes*, 6 August 1998, 1 [http://www.fas.org/news/usa/1998/08/980806-base.htm], accessed 11 February 2008.)

coverage extended to even more states and parts of Canada. The number of Nike sites around each city or military base varied, depending upon the number of sites required to defend each area in which critical military, industrial, governmental, and other important assets lay. Twenty-one sites stood guard over the Chicago-Gary Defense Area, the highest of any defense area. The smallest defense areas, like the one guarding Bergstrom Air Force Base (AFB), Texas, possessed only two Nike sites. The increased range of the Hercules missile reduced the requirement for firing batteries even further and thus most defense areas lost batteries when they transitioned from Ajax to Hercules missiles. Of the nineteen Nike sites in New York and New Jersey that watched over the New York Defense Area, only ten remained open after the conversion to Hercules missiles. This is not to say the Nike's defense network shrunk. The Army expanded its air defense coverage to new cities once the Hercules arrived, and each Hercules base defended a far greater area than earlier Ajax bases.[3]

All 275 Nike missile firing batteries spread themselves across an even greater number of sites, making them even more apparent to Americans.

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[3] Nineteen states possessed intercontinental ballistic missile bases. Twenty-nine states possessed Nike air defense missile bases. [Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 451-582; Christine Whitacre, ed. *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31.]

Each Nike installation possessed at least two sites: a launch site and an integrated fire control (IFC) site. A third administrative site used for housing, recreation facilities, and other basic needs was sometimes collocated with the integrated fire control site.[4] When military housing was unavailable, the Army occasionally constructed houses for soldiers and their families in a separate, fourth area. Even this mundane land use was recognized as Nike site property and contested by members of the public in different parts of the country.[5] For every four firing batteries, or battalion, there was another site containing a battalion headquarters and headquarters battery that focused upon leadership, administration, and logistics.[6] The Army typically collocated Nike command and control systems with headquarters units as well.

The Army began attempting to build public support for these planned air defenses while the Nike Ajax was still being developed, thereby heralding their arrival in American communities. Nearly three years before the first Ajax site was declared operational, the Army permitted *Life* magazine to print a large article on the Ajax with a photo of the Nike Ajax prototype.[7] The Army conducted its first major public display of the Ajax at many sites throughout

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[4] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 17.

[5] "Army House Hunting Stirs Local Unrest," *Chicago Daily Tribune*, 16 December 1956, p. S1; "Westport Refuses Army's Bid to Clear Snow from Its Street," *New York Times*, 30 November 1957, 18.

[6] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 152.

[7] "Air Defense of the U.S.," *Life* 30 (January 22, 1951): 77-89.

the country on Armed Forces Day in May 1953, over six months before the Army activated the first Nike site at Fort Meade, Maryland.[8] That same month, the *New York Times* printed an article describing details of the Nike system including underground missile storage, the speed of the Ajax missile, site acreage requirements, and the purpose of the missile system.[9] Officials from Nike units also met in advance with local leaders to inform them of impending base activations in their communities.[10]

Figure 9

"Contracts have already been let for much of the work on roosting places for the Nike – the deadly interceptor missile which will help guard this region against enemy attack.…It isn't a simple operation…There will be two areas for each steel and concrete base for the 1,500 mile-per-hour traveling Nike: the launching area with a fuel storage unit, underground magazines, and hydraulic elevators for bringing the missiles to the surface; and some 1,000 to 2,500 yards away, the vital control area…Contracts approved by Bay Area installations total nearly $3,000,000…The launching base in the Presidio will be on Mount Sutro, a 370-foot peak a few hundred yards west of the Funston Avenue approach to the Golden Gate Bridge, and due north of the Marine Hospital."

- Excerpt of an August 1954 *San Francisco Examiner* article. Details about Nike missile and site specifications were far from secret and surprisingly specific.

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[8] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 193.

[9] "Underground Units to Fire New Missile," *New York Times,* 24 May 1953, 38.

[10] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 3-4.

The widespread unpopularity of land acquisition for Nike sites highlighted the development of the missile system even more. An Army Corps of Engineers official admitted that the acquisition of land for Nike missile sites throughout the United States was unpopular. "…While almost everybody favored Nike, almost nobody wanted a unit located next door."[11] Local officials both proudly announced and publicly protested planned base placements in their communities even before the Army released the news to the general public.[12] While locals certainly had plenty of reasons to be concerned about a missile base in their community, they also had reasons to want these bases. In addition to a monthly payroll of approximately $25,000 (as of March 31, 1958) communities were told to expect the best personnel the Army had to offer. The intelligence and extensive training required to operate Nike systems allegedly attracted smart, mature, serious men more likely to be married and more likely to be of a higher rank than the average Army soldier.[13] Nevertheless, landowners and communities often fought against the planned placement of Nike firing batteries and housing in their localities for a variety of reasons.

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[11] Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 419.

[12] "Local Pride, Anger Nick Nike Secrecy," *New York Times,* 31 December 1953, 8.

[13] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 42.

Public opposition to Nike sites generally stemmed from four primary concerns: reductions in adjacent real estate values, falling boosters, crop damage, and possible misfires or explosions.[14] The Army made concerted efforts to address those issues and in doing so, demonstrated that the public not only knew about the Nike air defense missile system but also had a role in its design and deployment.

One of the principal ways Army officials addressed public concerns over real estate values was by reducing the amount of private land needed for Nike sites. While officials considered missile range, logical attack routes, radar obstructions, and other issues when placing Nike bases, they tried to use public land, especially federal land, when available. This helped keep costs low, minimized the inconvenience to civilians, and did not increase the number of tax-exempt properties in local jurisdictions.[15] Military planners initially determined that each Nike Ajax site would require 119 acres of land. This large size stemmed primarily from the explosive safety areas required when Ajax missiles were stored outdoors.[16] Late in 1953 the Army reduced

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[14] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 192-193.

[15] Department of Defense, Office of Public Information, "Army's Nike Guided Missile to Be Installed in Nation's Anti-Aircraft Defense System," in "Public Relations-Nike" folder, Box XVIII-34, "Military Missiles and Space," Military Files, U.S. Army Corps of Engineers Office of History, Fort Belvoir, Virginia, 1.

[16] The 1965 and 1970 versions of Army Regulations 210-30 state that requirements for sites with above ground storage of Hercules missiles was

this requirement dramatically by determining that missiles would be stored in underground magazines.[17] Even with the reduced land requirements provided by underground storage of missiles, each Nike site required roughly forty-three to seventy-one acres: fifteen to twenty-three acres for launch site operations, twenty-two to thirty acres for safety/standoff zones, and six to eighteen acres for the integrated fire control site.[18] Underground magazines produced not only substantial real estate acquisition savings, but they also provided better protection for the missiles from attack, and reduced missile

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even greater: from 13-18 acres for the integrated fire control site, from 35-125 acres for the launch site, and from 50-300 acres in easement for safety/standoff areas. [Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 182; Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 6 April 1965) 6; Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 23 July 1970) 3-3.]

[17] "Memorandum for Colonel Shuler: Nike Construction Changes in CWE," 5 July 1955, In "Nike - Construction Progress (cont.)," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 1.

[18] Nike site area requirements differed depending upon the source. In some instances specific terrain conditions changed these requirements even more. The requirements noted above are drawn from four sources published at times that range over the majority of the Nike system's life. [Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 417; Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 7 August 1957) 12. Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 6 April 1965) 6; Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 23 July 1970) 3-3.]

deterioration by an estimated $270,000 per battery annually, or the cost of three underground storage magazines.[19] The Army went so far as to place a Nike missile site on the grounds of a maximum security federal prison in Lorton, Virginia despite security concerns.[20]

Initially planning on constructing portable, prefabricated troop housing, the Army opted instead to construct buildings of a higher quality and architectural standard to appeal to the public and to save money on maintenance.[21] ARAACOM typically built Nike site buildings out of corrugated steel or concrete masonry blocks. While these buildings were no architectural gems, they represented a substantial improvement over the tents erected for antiaircraft artillery gun crews in the early 1950s.[22] While Nike batteries were considered semi-mobile, support requirements for missile sites (to include things like personnel housing, recreation facilities, fueling stations, and explosive safety requirements) effectively made the sites

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[19] John T. Snodgrass, Letter to Commanding General, Eastern Army Antiaircraft Command, "Constructing of Underground Launchers for Nike," (19 November 1953) In "Construction Changes in CWE," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 1.

[20] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 177.

[21] Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 419.

[22] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 98-99.

static.[23] The willingness of the Army to institute these development-delaying changes indicated the strong commitment of Army leaders to earn public support for these defenses, whose construction took priority over all other Army construction projects besides critical ammunition manufacturing plants.[24]

From 1952 to 1955, changes like these not only slowed development efforts, they also increased costs and public scrutiny of Nike sites from their earliest stages. The $700,000 required to construct the first Nike site relied upon heavy use of troop labor and austere design. By 1955, morale, recruiting, and public relations efforts produced site improvements that boosted the average cost of each site to $1,262,500, even with the use of the maximum amount of government land possible.[25] Construction of each Ajax site took between eight and nine months. The Army Corps of Engineers advertised building construction contracts for 30 days, awarding the contract to the lowest responsible bidder. In this manner, the Corps of Engineers

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[23] Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 418.

[24] Office of the Chief of Engineers, "Special Instructions and Engineering Data for Nike On-Site Program," 7 April 1954, In "Nike Construction Changes in CWE," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 2.

[25] "Memorandum for Colonel Shuler: Nike Construction Changes in CWE," 5 July 1955, In "Nike - Construction Progress (cont.)," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 2-3.

gained the support of labor leaders across the country in the construction of these sites, and underscored the presence of Nike sites even more.[26]

Like the logistics of Nike site construction, Nike missile equipment fabrication also increased public knowledge of the missile system. The reusable Ajax control system, which did not include the expendable missile, consisted of approximately 1.5 million individual parts supplied by several hundred businesses in over twenty states. These firms employed countless numbers of American workers who not only knew about the Nike system but also participated in the production of the system.[27] From February 1951 until February 1958, factories manufactured 13,714 Ajax missiles, and followed that accomplishment by producing over 25,000 Hercules missiles.[28]

While construction and production contracts rarely attracted much media attention, occasionally work related to Nike site development did make headlines. In 1959 Senator Robert Kennedy attacked one subcontractor performing work on 60% of the Nike sites in the Chicago area, claiming that the firm was owned by labor racketeers with ties to the Mafia and corrupt

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[26] Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 419-420.

[27] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 14-15.

[28] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 179-180; James Gibson, *The History of the U.S. Nuclear Arsenal* (Greenwich, Connecticut: Brompton Books Corp., 1989) 172-174.

Teamster officials.[29] In the spring of 1962, Senate investigators accused the Douglas Aircraft Company of pyramiding profits from Nike air defense missile contracts. Over three days of public hearings investigators presented evidence that Douglas earned over $45.5 million in profits on contracts where subcontractors performed 82.8% of the work.[30] These highly-public allegations highlighted the presence of Nike sites in yet another way for Americans living during the 1950s.

Public fear of falling missile boosters was another way Nike sites made headlines even before opening. Ajax missiles shed their boosters a few seconds into flight once roughly 4,000 feet off of the ground.[31] The Army began by equipping every Nike Ajax missile launch site with a clear area for the expended missile boosters to safely fall into. This circular area one mile in diameter was supposed to be centered at least 1.5 miles from the nearest launcher section, battery control area, or populated area. Engineers specified that the missiles not be fired straight up, but instead be fired from 1 to 5 degrees off of vertical to ensure boosters would not fall down upon the launch sites themselves.[32] Despite this area and despite the Army's insistence that

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[29] "Racketeers Linked to Concern Doing Defense Work in Chicago," *New York Times*, 13 March 1959, 18.

[30] "Row Over Missile Profit Probe: Senator Raps Staff's Douglas Air Figures," *San Francisco Examiner*, 9 April 1962.

[31] John Porter, Nike Site SF-88 (Oral) Guided Tour, 7 October 2005.

[32] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 188.

these missiles would only be fired during a time of war when far worse things than boosters would be dropping from the sky, members of the public remained concerned, and rightfully so. Army regulations stated that no effort would be made to purchase land or easements to keep booster disposal areas clear, if they were ever clear to begin with.[33] A study of existing Nike Ajax missile sites in the U.S. demonstrated that approximately 80% of those sites had some development, including housing, located in the required booster disposal area.[34]

The impending arrival of the Hercules missile only exacerbated the problem. The empty Hercules booster, which consisted of four Ajax boosters fused together, weighed 2,000 lbs. The Army tried to eliminate the booster disposal problem by requesting that contractors design the Hercules booster to self-destruct at the end of the boost

Figure 10

"There would be that danger…should we fire a Nike right now…but we don't, not unless we should be attacked, and, in that case, what would the public prefer? The possibility of being injured by small steel fragments - or the certainty of being destroyed by a nuclear blast?"

- Army spokesman rationalizing the need for Nike missiles whose heavy boosters could fall on populated areas

San Francisco Examiner, 20 December 1954

[33] Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 7 August 1957) 12.

[34] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 73-74.

phase. Unfortunately, engineers never identified a way to do that. The most feasible option seemed to be making the booster out of fiberglass, but this material produced a sub-standard end-of boost velocity and the larger diameter of the proposed booster required modification of 12,000 to 14,000 missile launcher rails. Again, economics along with some performance issues prevailed, and the Hercules retained its massive, droppable, metallic booster. The booster disposal area for the Hercules remained a circle approximately one mile in diameter, but the recommended location of its center changed to approximately 3/4 of one mile from the launch site.[35]

Figure 11

[A Nike site]…is not dangerous but safe as a gas station; as important to security and as much a part of the local community as the police and fire departments."

- Interview excerpt, Brigadier General R.R. Hendrix, commander of the Washington-Baltimore Defense Area, May 18, 1955

Asbury Park Evening Press, 23 May 1958

Fears of possible misfires or explosions also generated public concern, but the Army staved off these worries with a combination of design and public education. Officials noted how underground fuel storage tanks, subterranean missile magazines, earthen berms, safety easements, and altitude arming devices used to prevent missiles from exploding on the ground helped protect civilians from accidental

[35] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 68, 71, 77.

explosions. Through media interviews and public meetings Army officials compared the safety and necessity of Nike sites to gas stations.[36]

The Army dealt with complaints of crop damage by purchasing easements over affected farmland, though these easements varied and did not always please property owners. In Middletown, New Jersey the Army permitted Michael Stavola to build and maintain structures and vegetation up to sixty-five feet high on his land. In Cook County, Illinois, the Army declared that vegetation had to be cut down to the ground on Andrew Rafacz's farmland. Neither property owner was satisfied; both sued the Army, and both won.[37]

Once constructed, Nike installations were extremely apparent due to what can aptly be described as franchise-style architecture, equipment, and operations. The Army Corps of Engineers hired the Washington, D.C.-based architecture and engineering firm of Leon Chatelain, Jr. to design standard

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[36] "Commander Interviewed," and "Blast," *Asbury Park Evening Press*, 23 May 1958, 3, 18.

[37] Pre-Trial Order C-859-55, United States of America, Plaintiff, v. 21.66 Acres, Township of Middletown, Tract No. A107-E, Michael Stavola, Owner, Defendant, 20 December 1960, U.S. District Court, District of New Jersey, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Northeast Region (New York City) 2; United States of America, Plaintiff, vs. 117.7449 Acres of Land more or less, situate in the County of Cook, State of Illinois; and Andrew Rafacz, et al., Case No. 55C603, U.S. District Court, Northern District of Illinois, Eastern Division, Chicago, Civil Records, Civil Case Files, 1938-1969, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Great Lakes Region (Chicago).

plans for Nike integrated fire control and launch sites.[38] While layouts varied somewhat from site to site, Nike installations had nearly identical buildings and structures, both in terms of function and appearance. Whether two or three separate sites, each Nike firing battery physically occupied many acres of land and held far more acreage in easements. These easements not only provided a clear line of sight between the integrated fire control and launch areas but also provided a clear perimeter for physical security measures. Launch sites had protected underground rooms that crews could retreat to after readying missiles for launch. They also had generators for self-sustained electrical power when commercial sources failed.[39] Typical launch sites utilized three underground magazines, each of which had four above ground launchers.[40] Interstate Commerce Commission regulations prohibited the transport of fully armed missiles to Nike sites, so each site contained a missile test and assembly building.[41] An eight to ten foot high earthen berm surrounded the acid fueling station, acid storage building, and warhead

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[38] "CONUS Contracting and Construction," No Date, In "Manuscript-Nike," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 225.

[39] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 66.

[40] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 149-150.

[41] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 60.

building, to help protect the rest of the site from accidental explosions that occurred while fueling or arming the missiles (though Ajax sites typically used one building for warhead arming and refueling).[42] Kennels, sentry shacks, fallout shelters, barracks, radar towers, parking areas, mess halls, maintenance shops, and other buildings added to the easily identifiable pattern.

While Nike sites today look similar to formerly used industrial sites, the equipment used on Nike sites while they were active made them appear distinctly different. Launch sites equipped with the Hercules typically contained from twelve to eighteen of the forty-foot 10,711 lb missiles.[43] Nike units initially used three separate radars on the ground: one to acquire all incoming targets, one to lock on to each target, and one to monitor and guide the intercept missile.[44] Scientists developed massive, golf ball-like housings to protect Hercules radar dishes against high winds and corrosion. Made of silicon rubber-impregnated orlon, these radomes also improved maintenance

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[42] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 64-66.

[43] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 17.

[44] Robert Wells and C.R. Whiting, *Early Warning: Electronic Guardians of Our Country* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962) 72-73.

conditions for personnel servicing radar dishes in inclement weather.[45] Some radomes were inflatable and required blowers to circulate air twenty-four hours a day whereas others consisted of interconnected, rigid fiberglass panels.[46] As if these radomes were not already obvious enough, integrated

Figure 12

Accessing the inside of radome through a small hatch, a soldier performs preventative maintenance on an AN/FPS-71 radar system inside a massive radome on a Nike base outside of Fairbanks, Alaska.
Courtesy of U.S. Army

[45] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 85.

[46] Headquarters, United States Army Air Defense Command, *Programming Information, Fiscal Year 1965 and Fiscal Year 1966* (Colorado Springs, Colorado: Headquarters, United States Army Air Defense Command, 1964) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, chapter 5, pages 8 and 13.

fire control sites needed to be located on the highest ground in an area to prevent terrain, vegetation, or manmade objects from masking the system's radar.[47]

The high-speed takeoff of the Nike missile necessitated a degree of separation between launch and integrated fire control sites. At distances closer than one-half mile, the radar's hydraulics could not elevate rapidly enough to track the missile.[48] Separating the integrated fire control site from the launch site by a recommended distance of 1,000 to 6,000 yards (roughly one-half to three and one-half miles) spread

Figure 13

"Best known of the [Nike] sites in the Bay Area is Fort Barry, on the Marin headlands, where the plastic domed-batteries were visible for years from the Golden Gate Bridge and northern hills of the city."

- Excerpt of a newspaper article announcing the closure of San Francisco's Nike sites. Radomes provided a highly apparent indicator of Nike sites for area residents.

San Francisco Examiner,
4 February 1974

[47] Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 7 August 1957) 12.

[48] Untitled, undated Army Corps of Engineers briefing transcript, in "Nike - Construction Progress (cont.)," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 1.

this distinctly different equipment out even further and did nothing to hide the presence of Nike sites.[49]

Even within franchise architecture, variations do exist. Nike sites were no different. The majority of firing batteries possessed three underground storage magazines and twelve launchers. In rare instances some, like SF-88, had only two magazines and eight launchers.[50] Others, like Nike sites in Alaska and on Homestead Air Force Base in Florida, had above ground missile storage buildings, due to moisture problems below ground and to an abundance of available land. Initially all Nike sites were supposed to have enough area to contain double batteries, with those batteries being constructed at a later date if necessary; but when terrain limited the possible number of sites in some defense areas, the Army built and occupied double batteries immediately.[51] Double sites typically had from twenty to twenty-four launchers spread out over five to six below ground magazines.[52] Despite these differences, Nike bases far removed from each other provided an interchangeable, predictable service that millions of Americans experienced

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[49] Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 7 August 1957) 13.

[50] In SF-88's case, this was probably due to the proximity of another Nike site visible from SF-88.

[51] B.R. Wimer, Letter to C/Engrs, "Selection of Additional Nike Sites." 10 May 1954, In "Construction Changes in CWE," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 1.

[52] Mark Morgan, Nike Quick Look III (Ft. Worth, Texas: AEROMK, 1990), 20.

through not only the style of architecture and standardization of equipment on Nike bases but also through their uniformity of operations.

Operations at Nike sites integrated manpower and machines in a highly ordered, rapid routine. Upon receipt of an approaching enemy aircraft, Nike batteries sounded a blue alert to bring personnel to battle stations. Three missiles would be individually brought up on the elevator and placed on launchers beside the elevator. A fourth missile could be launched atop the elevator itself. When a target came within range of the acquisition radar a red alert sounded. The Battery Control Officer controlled the release of the missile, timing the launch based upon the most advantageous probable point of intercept.[53] Battery commanders were able to assign their own targets and monitor the targets already chosen by other battalion commanders. One person in the Nike battalion tracked friendly aircraft within range of the missiles and could override a battery commander who unwittingly targeted a friendly jet.[54] Sections fired their missiles in sequence, allowing the section not firing a missile to lower their elevator and bring forth another missile. Once no more missiles were left in the magazine, sections fired the three missiles placed on the launchers beside the elevator. If the missile failed to

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[53] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 70-71.

[54] Robert Wells and C.R. Whiting, *Early Warning: Electronic Guardians of Our Country* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962) 72-73.

fire within five seconds of initiation of firing, personnel lowered it back inside the magazine to prevent an explosion on the launch pad.[55]

Even when not actively engaged in combat, operations at Nike sites still conformed to a standard, predictable process not unlike that of a franchise. Security fencing, guard dogs, and armed sentries funneled vehicular and pedestrian traffic into and through the sections of each base. Like some suburban subdivisions, Nike facilities were gated communities with "codes, covenants, and restrictions" regarding the attributes and activities of persons who lived there. The most standardized processes were not security, however, but firing drills and alert levels designed to ensure constant readiness for combat.

In order to maintain constant coverage of defense areas while permitting some free time for troops on Nike missile sites, ARAACOM established alert standards for Nike units on permanent sites, beginning in 1955. At that time, 25% of Nike units were to maintain a fifteen minute alert status, 50% were to maintain a thirty minute alert status, and 25% were to be in a training and maintenance period that permitted them two hours to respond to an alert. Alert status meant the ability to fire a Nike missile within a given time standard and continue firing missiles at a regular rate until expending all missiles. Nike sites maintained one of these statuses twenty-

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[55] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 72, 74.

four hours a day. When units on fifteen minute alert or thirty minute alert became inoperational due to mechanical failures or other problems, units on two hour alert took over their duties.[56] ARADCOM changed alert levels over time. By the end of 1958, the fifteen minute alert had decreased to a five minute alert.[57] By the late 1960s batteries maintained five-minute, one-hour, and three-hour alert levels. Battalions with four batteries had the luxury of permitting one battery a twenty-four hour release.[58]

Five and fifteen minute alert statuses created near combat like conditions, since the enemy could literally attack at any time and missile system readiness for battle was paramount.[59] ARADCOM initiated surprise Operational Readiness Evaluations (OREs) to evaluate the performance of Nike firing batteries at these readiness levels.[60] Sirens could signify an attack, exercise, or evaluation. Neither the average soldier nor members of the public knew when the sirens wailed whether they were under attack or

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[56] Roy S. Barnard, *The History of ARADCOM Vol. 1, The Gun Era 1950-1955* (Headquarters, ARADCOM, Historical Project ARAD 5M-I [no date]), 185.

[57] Susan Cheney, Interview by John Martini, 9 May 1993, Interview GOGA-18808, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 16.

[58] Terry Abel, Interview by John Martini, 7 June 1992, Interview GOGA-18811, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 4.

[59] Roy S. Barnard, *The History of ARADCOM Vol. 1, The Gun Era 1950-1955* (Headquarters, ARADCOM, Historical Project ARAD 5M-I [no date]), 185.

[60] Susan Cheney, Interview by John Martini, 9 May 1993, Interview GOGA-18808, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 16.

simply running a drill.[61] This uncertainty made life on and around Nike air defense missile sites tense and did nothing to mask the presence of these defense sites.

The Nike missile system extended into American society well beyond plots of land used by individual firing batteries. Until 1957, the voice, telephone, and radio communication system was arguably the weakest link in the Nike system. This communications network linked Army air defense command posts (AADCPs) with the firing batteries they coordinated. While ARADCOM's 20,300 mile secure tactical teletype system and backup radio communication system provided good voice communication links between Nike sites, ARADCOM lacked digital data transmission lines.[62] Even once it developed those lines, ARADCOM leased telephone lines used to transmit voice and data communications for units from firing batteries all the way up to the highest level of computerized command and control: the Air Force's Semi-Automatic Ground Environment (SAGE). This dependence is not altogether surprising, since one of the principle creators of the Nike system was Bell Telephone, who controlled civilian telephone lines and phones.[63]

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[61] Roy S. Barnard, *The History of ARADCOM Vol. 1, The Gun Era 1950-1955* (Headquarters, ARADCOM, Historical Project ARAD 5M-I [no date]), 185.

[62] United States Army Air Defense Command, *ARADCOM Argus* (November 1959).

[63] In the mid 1960s the Army shed its dependence on landlines and installed a microwave communication system. [Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 19; "Microwave to Link 12 Nike Bases Here," *Chicago Tribune*, 4 October 1965, A3.]

The Army developed a new system to improve this situation. Dubbed Missile Master, this device used automatic data links (ADLs) to send data directly from firing batteries to Army air defense command posts. With the development of the first Missile Master system in December 1957, Army air defense command posts possessing the system could direct twenty-four separate firing batteries at one time.[64] It also enabled commanders of batteries to identify targets previously engaged by other Nike units and radar blips that represented friendly aircraft.[65] Missile Master was not a perfect system. It needed to be placed relatively close to the center of the area it was defending, which often put the system at ground zero for an expected nuclear attack. Missile Master was also a bit overqualified, able to command twenty-four batteries at once, which no single defense area possessed once the Hercules missile replaced the Ajax.[66] Additionally, SAGE and Missile Master could not communicate without the help of a digital data converter.[67] Missile Master controlled Nike battalions, but SAGE fed Missile Master crews information from distant radar stations that gave Missile Master early warning

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[64] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 23-24; United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 6.

[65] United States Army Air Defense Command, *ARADCOM Argus* (February 1958) 5.

[66] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 30.

[67] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 33.

far beyond the capabilities of the radar on Nike sites. Once the target was close enough, Missile Master tracked it and, with the help of officers determining which bombers to target, assigned missiles to particular bombers.[68]

The Army also fielded a more mobile form of Missile Master, titled BIRDIE (Battery Integrated Radar Display Equipment), and a fire control system designed to communicate with Army units in the field, called Missile Monitor. Missile Master was generally used for command and control in the larger defense areas and BIRDIE in the smaller areas. BIRDIE cost less and came in two versions.[69] Each Nike base possessed the capability to engage targets on its own if communication with BIRDIE or Missile Master were cut.[70] Besides Missile Master, BIRDIE, and Missile Monitor, the AN/TSQ-51 (CONUS Air Defense Fire Coordination System) provided yet another command and control system option. Whichever the AADCP used, it was better than the voice-only data transfers that existed prior to the advent of Missile Master.[71]

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[68] Robert Wells and C.R. Whiting, *Early Warning: Electronic Guardians of Our Country* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962) 70-72.

[69] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 24-25, 30.

[70] Headquarters, U.S. Army Air Defense Command, "Command Report, U.S. Army Air Defense, 1 Jul - 31 Dec 1961," Center for Military History, Washington, D.C., 22.

[71] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 30.

While neither the Missile Master, Missile Monitor, or BIRDIE systems markedly increased the profile of Nike sites in the eyes of the average American, the controversy surrounding Missile Master did. The Air Force claimed that Missile Master duplicated and challenged SAGE. In an effort to end the conflict, Secretary of Defense Charles Wilson assigned SAGE the duty of tracking all air defense weapon systems, yet he also directed SAGE units to share their data with Missile Master units. This action may have clarified roles, but it did not end an Army-Air Force rivalry over air defense that revealed many details of air defense bases, to include Nike sites, to the American public throughout the 1950s and early 1960s.[72]

American citizens not only knew about these defenses through media coverage of interservice bickering, they directly supported troops on these bases and experienced relatively large degrees of interaction with these military personnel. Unlike large Army posts that dominated the landscape, Nike sites typically held 125 soldiers and were often placed on the fringes of urban development due to missile ranges and lower land acquisition costs.[73] Nike bases enjoyed a more symbiotic relationship with their neighbors,

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[72] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 60.

[73] Authorized personnel strengths fluctuated on Nike bases as equipment changed. Actual strengths fluctuated as personnel demands and recruiting fluctuated. In general, 125 seems to be an average personnel level for Nike sites during their active military life. [Alaska Office of History and Archaeology, *Site Summit: Nike Hercules Missile Installation* (Anchorage: Alaska Department of Natural Resources, 1996) 11.]

depending upon civilian supply, recreation, housing, and other necessities far more than larger Army bases which Nike sites were often far from. When natural disasters struck or special manpower and equipment was needed, local Nike commanders frequently volunteered the services of their troops, whether to search for missing persons, to rescue civilians stranded by blizzards, or simply to participate in community events. Nike units seemed to be constantly donating blood for local emergencies and generally conducted many other activities that helped solidify their position as members of local communities.[74]

Figure 14

"No soldier comes into more intimate association with the community where he is stationed than the Army Antiaircraft Command soldier, whose battery is often within a residential district. Usually his family lives in one of the nearby homes, and his home is normally not more than minutes away from the Nike missile site. His duty is one of constant watching and readiness, and of constant on-the-job training to keep up his efficiency. He lives, he trains, and is prepared to do combat, if necessary, in the community he defends."

- Excerpt of a 6th ARADCOM Region Nike Fact Sheet and Speaker's Guide

Over time, the distinction between Nike personnel and community members diminished even further as soldiers moved into community housing and community members became Nike soldiers and technicians. Recruiters on Nike missile bases often targeted local males, offering them an assignment at the site of their choice in

[74] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, V-19, VI-14.

return for their enlistment.[75] This made both civilian and military personnel at some bases partly local. Army National Guard units made up of full-time technicians and part-time soldiers manned Nike sites, to include sites with the Hercules nuclear air defense missile. These personnel lived in or near the communities they defended and often grew up in those communities.

The coming and going of uniformed personnel also made the presence of these sites readily apparent, especially when flying in the latest technology. The Army began assigning helicopters and fixed-wing aircraft to ARADCOM units in 1955 to provide rapid, dependable transportation to battery sites and different ARADCOM headquarters.[76] Many Nike bases built onsite heliports.[77]

At times members of the public had more personal encounters with this technology. The 45th Antiaircraft Artillery Brigade used its helicopters and trucks to rescue snowbound people in northwestern Indiana after major snowstorms in 1958 and 1967.[78] The coming and going of young men in uniform attracted a different sort of attention as well. Jan Rovner, a veteran

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[75] *Dakota County* (Minnesota) *Tribune* 25 July 1957, 1-1.

[76] United States Army Air Defense Command, "USARADCOM's Aircraft Familiar Sight in Field," *ARADCOM Argus* (May 1958) 7.

[77] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, IX-5.

[78] United States Army Air Defense Command, "Scores Trapped in Snow Storms Are Rescued by USARADCOM Personnel in 'Copters, Trucks," *ARADCOM Argus* (April 1958) 1; "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United

Figure 15

Captain Jack Gerber, 30th Artillery Group, transports a Nike Ajax missile at Crissy Field with a H-21 Helicopter in the late 1950s. Utilization of the latest technology to haul missiles through the sky to and from Nike sites highlighted the presence of these defense bases.
Courtesy of U.S. Army

of Headquarters Battery, 3/68 Artillery from 1966 to 1970 remembered military men bringing local girls onto Fort Snelling, the command center of the four Nike batteries surrounding Minneapolis and St. Paul, Minnesota. The drinking age on federal reservations was eighteen at that time, three years

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States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, VII-10.

younger than Minnesota's twenty-one. Military personnel simply had to sign these visitors in to bring them onto the base.[79]

Far from being concealed, Nike sites were advertised. The 6th ARADCOM Region expected commanders to encourage the public to visit selected sites within their command. "Selected sites" meant easily accessible batteries with excellent appearances. Headquarters stipulated commanders establish regular tour days and hours, posted on signs leading to each Nike site and published with the local news media. The 6th Region hoped the tours would cause the public to appreciate the capabilities, mission, and high quality personnel of these Nike sites.[80]

The public did not have unlimited access to Nike sites, but the basic security measures Nike sites followed were hardly enough to keep the sites secret. No visits were permitted after dark and visitors had to be escorted by site personnel. Each site maintained a visitors log, though no one was forced to sign it. ARADCOM's 6th Region Headquarters did give some people

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[79] Jan Rovner, E-mail to Author, 3 February 1999.

[80] W.F. Spurgin, Headquarters, 6th Antiaircraft Regional Command, Fort Baker, California, "Circular Number 9: Visits to Units and Installations," 25 February 1957, G3 Section, Organization Planning File, 1958, Advisors' Conference, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, California, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 1.

permission to photograph sites, but anyone without that liberty had to check their cameras at the gate.[81]

Nevertheless, photographic images of Nike sites were not only permitted, they were seen in mass media. In June 1955 *Aviation Week* featured photos of Nike Ajax missiles being fueled, checked, raised from the magazine, on the firing line with crewmen running to the missiles, and even in an assembly line clearly identified as the Douglas Aircraft Company's Santa Monica (California) Division.[82] Far from the tail end of the Nike's lifespan when critics deemed the system obsolete, this article was published while Ajax sites were still being constructed.

The Army went far beyond promoting media coverage in its efforts to convince the American public that the Nike air defense missile system was a protector, not a hazard. The Army released two of its own public information films on the Nike system, the first in 1954 and another in 1956, both of which attracted an estimated thirty million viewers each.[83] Ironically, accidents at

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[81] W.F. Spurgin, Headquarters, 6th Antiaircraft Regional Command, Fort Baker, California, "Circular Number 9: Visits to Units and Installations," 25 February 1957, G3 Section, Organization Planning File, 1958, Advisors' Conference, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, California, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 1-2.

[82] "Firing Nike Guided Missile from Anti-Aircraft Launching Sites," *Aviation Week* (6 June 1955) 17; "Nike Line," *Aviation Week*, 6 June 1955, 13.

[83] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public*

Nike sites increased access to missile sites. Bent on maintaining a good image, the Army gave increased numbers of tours during these times.[84] Nike bases were so well visited, one begins to question how the bases could ever have been considered secret. Over 1,300 Boy Scouts visited 6th ARADCOM Region Nike bases each month in 1959.[85] One Cub Scout pack in the Chicago area spent the entire weekend on a Nike site, participating in activities at the launch and control areas, sleeping in the barracks, and eating in the mess hall.[86] Even Hercules missile firings were occasionally open to the public, to include one held just two days after the first Nike Hercules site was declared operational.[87] In the 1950s and 60s the sixteen Nike missile sites surrounding Los Angeles received visits from many Hollywood movie stars who wanted to pose for photos with missiles.[88] Many air defense sites held beauty pageants, dubbing young ladies with such exalted titles as Miss Nike; Miss 4th Missile Battalion, 65th Artillery; Miss Headquarters Battery,

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Relations (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 2.

[84] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 380, 393.

[85] United States Army Air Defense Command, "Past Year's Pictorial Review of Community Relations Activities," *ARADCOM Argus* (September 1960) 7.

[86] “Cub Scouts Join Army Unit for Week-End,” *Chicago Daily Tribune*, 24 April 1958, W7.

[87] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 240.

[88] "Historical Record of the Headquarters, 343d Fighter Group for the Period Ending 30 September 1963," Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 2.

50th Artillery Group (MSP); Miss Zero Defects; Queen of the Seattle Army Air Defense; and "Queen of the Atomic Frontier Days."[89] Armed Forces Day parades and displays in New York City included Nike Ajax and Hercules missiles viewed by vast numbers of spectators.[90] Even Santa Claus knew about Nike sites. One hundred children of members of the 45th Artillery Brigade met Santa at the brigade's Officer's Club on December 19, 1970. While not accompanied by Rudolph that day, Santa's steed did have a glowing nose of sorts. He rode in on a Nike Hercules missile, the nuclear-tipped successor to the Ajax.[91]

The arrival of nuclear Hercules missiles in the late 1950s changed the public's access to these sites and information about these sites only slightly. The Army, clearly concerned with the public relations impact of placing nuclear missiles on Nike bases, decided to formally announce to the public the impending arrival of Hercules missiles. Numerous Department of Defense press releases had already made the development and planned deployment of the Hercules apparent to the public many months before this, but on February 20, 1957, Secretary of Defense Charles Wilson went far beyond these earlier statements in what was clearly an effort to win the

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[89] United States Army Air Defense Command, *ARADCOM Argus*, various issues.

[90] "U.S. Might in Men and Missiles Paraded on 5th Ave.," *New York Times*, 18 May 1958, 1; "Missile Display Is Opened in City," *New York Times*, 10 May 1958, 11.

[91] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, X-5.

Figure 16

"United States Scientists were disclosed today to have completed an atomic anti-aircraft shell for the Nike guided missile – casting the atom for the first time in a purely defensive role…The shell, capable of destroying with one blast all planes in a path a half mile or more wide…is expected to be exploded for the first time during several weeks of a series of atomic weapons tests scheduled to begin in Nevada February 11...The principal remaining question is whether atomic shells could be used close to cities…There is reason to believe that, because of the great altitude at which the Nike missile operates, an atomic warhead could be used sparingly without serious local damage. Four miles of altitude would place the inhabitants below and well beyond the direct radiation and "total destruction" ranges of the Hiroshima and Nagasaki bombs, which the first anti-aircraft warheads will resemble in power. Radioactive fallout – the later fall of minute particles made radioactive by the explosion - presents a serious question which the Atomic Energy Commission is now studying intensively."

- Excerpt of a January 1955 *San Francisco Examiner* article. Newspaper reports clearly indicated the impending arrival of nuclear air defense missiles years before the first Nike base received Hercules missiles.

support of the American public. In an extensive press release, the Secretary explained that the nuclear blast of these strictly defensive missiles made them the most effective weapons against aerial assault. He even went so far as to reveal that the Air Force was already using nuclear air-to-air rockets on Air Force fighter-interceptor jets for the air defense of the contiguous United States.[92]

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[92] "Defense Aides Back Nike, Call New One Phenomenal," *New York Times,* 29 May 1956, 1; "Army Gives Missiles Mythological Names," *New York Times,* 30 November 1956, 15; "Army Developing New Atom Missile," *New York Times,* 24 December 1956, 24; Commanding General, Army Antiaircraft Command, Ent Air Force Base, Colorado, Memorandum "To All

> Elaborate precautions have been taken in the design and handling of these air defense weapons to minimize harmful effect's resulting from accidents either on the ground or in the air. Atomic weapons tests conducted by the Atomic Energy Commission have confirmed that the possibility of any nuclear explosion occurring as a result-of an accident involving either impact or fire is virtually non-existent. As stored and carried these weapons emit no harmful radiation and present no radiation hazard to persons living near or passing by locations where they are deployed. Many personnel already work in the vicinity of nuclear weapons daily.[93]

The Army did not reveal every detail about this nuclear weapons deployment. Neither the location of bases containing these nuclear weapons nor the schedule under which they would receive those weapons were public information. But the Secretary of Defense did try to allay fears of nuclear weapons by releasing additional details. He noted the elaborate precautions taken to ensure accidents resulted in minimal damage. He explained that the probability of a nuclear explosion as a result of an accident was virtually nonexistent. He further reassured the public that these weapons emitted no harmful radiation to people living near or passing by the sites where the warheads were located. He cited a high altitude test of a nuclear air defense

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Units, Commands, PI Message Number 55, Release Nuclear Weapons Item and Fact Sheet," 18 February 1957, AG Central Files, 1957, Publicity, Box 2, Records of the 6th Region, Air Defense Command, Ft. Baker, CA, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 2.

[93] Commanding General, Army Antiaircraft Command, Ent Air Force Base, Colorado, Memorandum "To All Units, Commands, PI Message Number 55, Release Nuclear Weapons Item and Fact Sheet," 18 February 1957, AG Central Files, 1957, Publicity, Box 2, Records of the 6th Region, Air Defense Command, Ft. Baker, CA, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 2.

weapon that demonstrated that no individuals or property sustained blast damage. Furthermore, radiation measured from the ground directly underneath the explosion revealed exposure levels less than 1/100th of the standard x-ray procedure. The memo describes high-altitude blasts as an intense flash of light and the production of a white cloud, not the mushroom cloud which occurs when a nuclear blast near the earth's surface draws matter up into the air on strong vertical currents.[94] The Secretary of Defense was so concerned with the public relations impact of placing nuclear missiles in populated areas that he even sought to remove the standard imagery of a nuclear mushroom cloud from nuclear air defense missiles like the Nike Hercules. Rather than hiding the presence of nuclear Hercules missiles, the Army announced to the press that no radiation hazard existed for people living near routes used to deliver nuclear warheads to Nike sites.[95]

Additional Army activities highlight the importance placed on information sharing with the public during this time. A memorandum distributed to all Nike commanders in March 1958, several months before the

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[94] Commanding General, Army Antiaircraft Command, Ent Air Force Base, Colorado, Memorandum "To All Units, Commands, PI Message Number 55, Release Nuclear Weapons Item and Fact Sheet," 18 February 1957, AG Central Files, 1957, Publicity, Box 2, Records of the 6th Region, Air Defense Command, Ft. Baker, CA, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 3-4.

[95] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 21.

opening of the first Hercules site, recommended that battery commanders contact a wide variety of community leaders (to include religious leaders, political figures, the police, and women's clubs) one month before new units moved into communities. This memorandum also recommended that sites schedule weekly public visiting hours and encouraged commanders to use troops for everything from Little League coaches to public improvement projects to disaster relief efforts.[96] The government made it clear that Nike Ajax firing battery commanders should answer public inquiries about Hercules missiles prior to their arrival.[97] Far from being clandestine, the Hercules deployment involved a calculated public relations campaign conducted by everyone from the Secretary of Defense down to Nike battery commanders and soldiers.

A case study in Army public relations credits these activities with producing subdued public concern when ARADCOM deployed nuclear Hercules missiles.[98] Certainly, these efforts did not conceal the presence of

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[96] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 41-45.

[97] Commanding General, Army Antiaircraft Command, Ent Air Force Base, Colorado, Memorandum "To All Units, Commands, PI Message Number 55, Release Nuclear Weapons Item and Fact Sheet," 18 February 1957, AG Central Files, 1957, Publicity, Box 2, Records of the 6th Region, Air Defense Command, Ft. Baker, CA, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 2.

[98] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public*

Nike sites. ARADCOM's February 1958 announcement informing the public about the impending arrival of the Hercules missile in the Chicago-Gary Defense Area resulted in over 100 inches of clippings in local newspapers, four local radio reports, and two CBS television news broadcasts, to include footage of missiles in one firing battery.[99]

The Army did not attempt to conceal the location of Nike sites. While Nike sites did possess names like SF-88, C-47, and NY-53, the names were far from coded and also came with more commonplace designations. The initial letter(s) in each site name stood for the defense area the site guarded, such as San Francisco (SF), Chicago (C), and New York (NY). ARADCOM also identified Nike sites by using the name of the community in which the site lay, and local media followed suit, referring to the Wheeler Nike site or Middletown Nike site, for example, more frequently than each site's letter-numeral designation.[100]

Even aerial photos and maps, two very basic sources of military intelligence, depicted Nike sites. United States Geological Survey (USGS) topographic maps showed site buildings. Sometimes they labeled these sites

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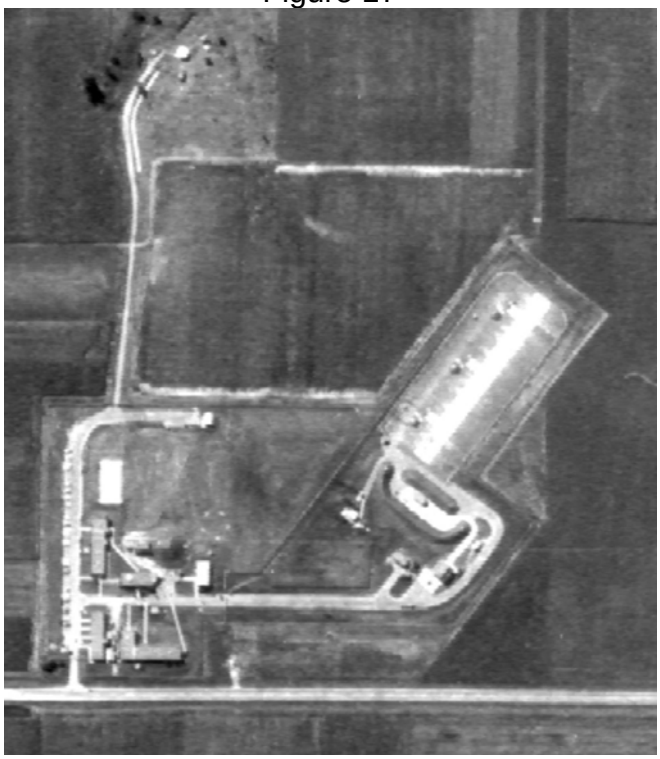
Relations (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 4.

[99] United States Army Air Defense Command, "5th Region Gets Results in News," *ARADCOM Argus* (March 1958) 8.

[100] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 3-4.

Figure 17

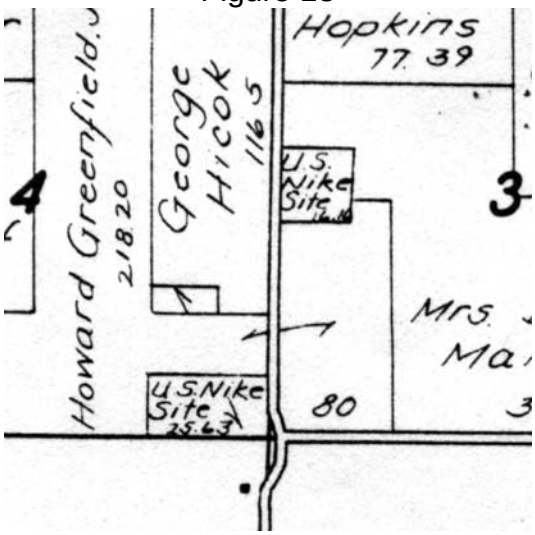


1970 aerial photograph of the Nike missile launch site in Farmington, Minnesota
Photo # WK-1LL-92

"U.S. Military Reservation" or listed the actual name of the station. Atlas and plat books listed missile sites either as property of the United States government or specifically as Nike missile sites. Aerial photographs made no attempt to hide Nike air defense missile sites, even when other military assets were eliminated from photos. In one telling example, Nike site NY-53 in Middletown, New Jersey is plainly apparent in an aerial photo while the Naval Ammunition Depot immediately adjacent to the integrated fire control site is

blacked out of the photo.[101] Many of these sites exist to this day and continue to be depicted on a wide variety of maps.

Figure 18



1962 plat land atlas listing of a Nike launch site and integrated fire control site in Roberts, Wisconsin
Triennial Atlas and Plat Book, 27.

As with Ajax sites, economics played a big role in Hercules site selection.[102] Officials believed that retrofitting Ajax sites for use with Hercules missiles would only require 10% of the approximately $1.4 million it cost to build each Ajax site.[103] The cost to relocate and convert Nike Ajax site

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[101] Graphics Department, Monmouth County Planning Board, Freehold, New Jersey, Untitled [Aerial Photo], CNB-8R-99, 2 May 1957.

[102] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 23.

[103] United States Army Air Defense Command, "Hercules Due," *ARADCOM Argus* (February 1958) 2.

equipment for use with Hercules missile was estimated at $2.3 million per battery, so existing Nike units were relocated. That meant some Hercules missiles with a range of over seventy-five miles were placed on Ajax sites designed for missiles with a twenty-five mile range.[104] In a speech to the Army War College in 1963 the Commanding General of ARADCOM, Lieutenant General William Dick, admitted that placing Hercules sites in old Ajax positions did not take advantage of their vast improvement in range and left them sitting on top of the targets they were designed to protect.[105] Los Angeles exemplified the poor tactical placement of Hercules batteries. A 1963 review of the placement of Hercules batteries around Los Angeles by the Comptroller of the Army found that the sites' close proximity to the city's center meant the majority of Hercules sites around the city would not survive an intercontinental ballistic missile attack.[106] Even the increased power of the Hercules' nuclear warhead did not make the Army choose new sites. Most Ajax sites did not require additional land to be converted to Hercules sites yet all Hercules sites were scheduled to receive atomic warheads. This massive

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[104] Program Review Division, Office, Director of Review and Analysis, Office, Comptroller of the Army, *Command Analysis, U.S. Army Air Defense Command* (Washington, D.C.: Department of the Army, Office of the Comptroller of the Army, 1963) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 8-9.

[105] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 29-30.

[106] Program Review Division, Office, Director of Review and Analysis, Office, Comptroller of the Army, *Command Analysis, U.S. Army Air Defense Command* (Washington, D.C.: Department of the Army, Office of the Comptroller of the Army, 1963) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 9.

increase in explosive power did not prompt the Army to purchase additional safety easements around missile sites.[107] The safety zone around these nuclear warheads would have undoubtedly been enormous and expensive. It also would have entailed abandoning most former Ajax sites. The possibility of site closures and loss of Army National Guard and technician jobs alarmed many congressmen who applied political pressure to prevent this from happening. In addition to providing a cost savings in terms of land, the policy of reusing Ajax sites maintained technician jobs in the communities where the jobs originated.[108]

Nike sites underwent distinct changes when converting from Ajax to Hercules missiles. As with initial construction projects on Ajax sites, these changes increased public awareness of Hercules sites. Civilian firms bid on, designed, and constructed a variety of new features to include control systems designed for use with either Ajax or Hercules missiles.[109] Fallout shelters, previously absent on Nike sites, replaced liquid fueling facilities no longer needed with the arrival of the solid fuel Hercules. Other modifications included increasing the lift capacity of magazine elevators to account for the

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[107] "Storage and Construction Considerations," in "Nike - Construction Progress (cont.)," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 1-2.

[108] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 228.

[109] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 136.

much heavier Hercules missile, reinforcing the elevator doors to account for the increased thrust of the Hercules, and repositioning the satellite launchers to prevent the force of Hercules missile launches from damaging the magazine's walls and roof. The Army even addressed soil erosion, replacing temporary missile blast pads on the satellite launchers with a full concrete apron, realigning roads, and stabilizing surfaces susceptible to erosion from the force of missile launches. Unfortunately, the issue of falling boosters remained unaddressed. Modifications required due to the presence of atomic warheads included guardhouses for each sentry post, surveillance lighting, an arched cyclone security fence segregating the launcher area from the rest of the site, and alarm devices designed to detect the presence of tritium gas within the storage shelter.[110]

The arrival of nuclear Hercules missiles also produced more telltale signage indicative of the presence and components of Nike sites. ARADCOM policies required a variety of signs on each Nike site, to include signs posted around the edge of the restricted launcher area, signs identifying the fuming

[110] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, VII-1; "Storage and Construction Considerations," in "Nike - Construction Progress (cont.)," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 2-4.

acid storage area, sentry dog warnings on perimeter fences, and a "radar radiation zone" sign posted at the outer limits of this area.[111]

The Army did not significantly improve the Ajax system after fielding it.[112] The Hercules, on the other hand, was subject to several major upgrades, all of which required additional civilian firms to design, build, and install new equipment. Following the deployment of the basic Hercules system in 1958 the Army initiated upgrades to the tracking and guidance system to produce an improved Hercules system in June 1961. This upgrade enabled the Nike Hercules system to engage low altitude, highly aerodynamic targets embedded with extensive electronic countermeasures traveling at up to three times the speed of sound (MACH 3). This included not only aircraft but also some missiles.[113] A new High Power Acquisition Radar (HIPAR) increased the system's target acquisition range from 125 to 175 nautical

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[111] W.A. Perry, Headquarters, United States Army Air Defense Command, "Memorandum Number 42: Safety Color Markings and Signs at Nike Sites," 28 July 1959, Missile Officers' Conference, 1-2 December 1959, G3 Section, Organization Planning File, 1959, Commander's Conference Notes – II, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, California, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 4-1, 4-3 to 4-4.

[112] B.N. McMaster, et al., *Historical Overview of the Nike Missile System* (Gainesville, Florida: Environmental Science and Engineering, Inc., 1984) 2-2.

[113] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 161-163.

miles.[114] An enhanced Target Tracking Radar (TTR) increased the range of the system and a Target Ranging Radar (TRR) enabled the Hercules system to penetrate heavy electronic countermeasures used by attacking forces.[115] The Army also went on to develop a Hercules Antitactical Ballistic Missile (ATBM) system in 1963, though budgetary constraints prevented all Hercules sites from receiving these upgrades.[116]

ARADCOM made other changes that highlighted the presence of Nike sites, including the use of sentry dogs. Depending upon the size of the Nike site, each installation typically had four or more sentry dog teams.[117] Their purpose was to guard the base against fire, sabotage, unauthorized entry, and vandalism. ARADCOM used only German Shepherds due to their temperament, endurance, size, and ability to adapt to virtually any area.[118]

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[114] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 32.

[115] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 164.

[116] B.N. McMaster, et al., *Historical Overview of the Nike Missile System* (Gainesville, Florida: Environmental Science and Engineering, Inc., 1984) 2-3 to 2-4.

[117] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 42.

[118] Headquarters, U.S. Army Air Defense Command, "Command Report, U.S. Army Air Defense, 1 Jul - 31 Dec 1961," Center for Military History, Washington, D.C., 16.

Figure 19

“Killer Dogs on Guard at Nike Missile Site”

- This 1961 *New York Times* article title gave residents another reason to pay attention to Nike sites in their midst

These sentry dogs definitely increased the military appearance of Nike sites, but their presence was relegated to launch sites only. The absence of dogs at administrative and integrated fire control sites, the latter of which were even more sensitive and easier to damage or disrupt than the launch site, indicates that ARADCOM’s purpose in using these dogs was primarily to prevent nuclear incidents or losses, not to accomplish other mission requirements.

Other new security measures confirmed this purpose. New fencing segregated the Hercules missile storage and launch area from the rest of the launch site. Every soldier in the battery had to possess a security clearance once nuclear missiles arrived.[119] No one was allowed in the launcher area alone. The Army required at least two individuals be present and within sight

[119] Program Review Division, Office, Director of Review and Analysis, Office, Comptroller of the Army, *Command Analysis, U.S. Army Air Defense Command* (Washington, D.C.: Department of the Army, Office of the Comptroller of the Army, 1963) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 13-14.

of each other at all times around nuclear warheads.[120] After warning intruders, ordering them to halt, firing a warning shot, and firing a wounding shot, soldiers had orders to shoot to kill intruders.[121] In one instance a soldier at SF-88 who tried to covertly climb the exclusion area fence to embarrass the military police guards was led out at gunpoint.[122]

These new measures proved effective. ARADCOM held exercises in which Zone of the Interior Army personnel attempted to penetrate Nike site security, specifically by trying to gain access to the restricted area of Hercules sites. Available records indicate no success in those penetration attempts. Typical security penetration attempts consisted of military personnel posing as military contractors with government identification trying to access the restricted area to repair equipment. The only ways to access the restricted area of these sites was to be recognized visually as a member of the unit authorized access to the area or when granted permission for a specific visit by officers of the battery when military necessity dictates. Representatives of

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[120] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 42.

[121] Susan Cheney, Interview by John Martini, 9 May 1993, Interview GOGA-18808, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 9.

[122] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 44.

contracted firms could visit using the latter provision but had to be accompanied by an officer at all times.[123]

While nuclear missiles did produce increased physical security on Nike missile sites, the Army continued to publicize and promote Nike sites. "Fact-finding" trips formally dubbed "Operation Understanding" brought local VIPs to Fort Bliss, Texas and Ent Air Force Base, Colorado in an effort to teach members of the public about the nature of Nike site operations.[124] Between the middle part of 1957 and June of 1960 the 6th ARADCOM Region alone sent thirty-four civilian groups of roughly eighteen people each to see Nike units from their communities fire live missiles as part of their Annual Service Practice at Fort Bliss.[125] Operation Understanding even brought local leaders to witness the first official firing of a Hercules missile at Fort Bliss in 1958.[126] The Army did not simply target elected officials, industry executives, or even

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[123] "Nike Security" (an undated, typed document with no author), G3 Section, Organization Planning File, 1959, Commander's Conference Notes – II, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, California, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 2-1.

[124] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 99.

[125] "Brochure Contents" (an untitled, typed document with no author), 23 June 1960, G3 Section, Organization Planning File, 1959, Briefings, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, CA., Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 31.

[126] United States Army Air Defense Command, "Community Leaders See First Firing of Nike Hercules," *ARADCOM Argus* (June 1958) 2.

males. One delegation consisted entirely of women.[127] A case study in Army public relations noted that Operation Understanding helped Nike public relations tremendously.[128]

Indeed, the importance placed upon good public relations definitely increased with the arrival of nuclear missiles on Nike sites. The Secretary of the Army may have ordered condemnations of land to build Nike sites, but he also emphasized keeping the public as informed as possible about Nike operations. He also felt it important to keep Nike troops well informed, since they represented the Army to average Americans and because they could hinder even the best public relations effort without proper information. ARADCOM considered the public relations mission so important that it developed an official public relations fact sheet for use by commanders and troops that included key data about the Nike system and individual sites.[129]

The 6th ARADCOM Region provides an interesting sample of these efforts in a single defense area. The 6th Region made a color film titled "Your Nike Neighbor." The film and radio program interviewed local Nike personnel

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[127] "Brochure Contents" (an untitled, typed document with no author), 23 June 1960, G3 Section, Organization Planning File, 1959, Briefings, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, CA., Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 31.

[128] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 4.

[129] United States Army Air Defense Command, *ARADCOM Argus* (November 1959) 3.

on the job in an effort to demonstrate their value to local communities. The command distributed a radio version of this film and color slides to communities. The region also had a Nike Hercules display unit, viewed by more than four million people on the west coast before the middle of 1960.[130] The California State Museum of Science and Industry in Los Angeles installed a twenty-day exhibit on the Nike Ajax viewed by over seventy-five thousand visitors. Approximately two hundred thousand people saw other displays also sponsored by the 108th Air Defense Artillery Group during March 1958.[131]

Figure 20

"It is imperative, therefore, that the public be kept as well informed as security will allow. They must know our plans, our requirements, and our day-to-day progress in meeting our grave responsibilities. Only then can we make them aware of the Army's ability to preserve the peace and of our readiness to fight the communist conspiracy in either a large scale war, or a limited conflict, with either nuclear or conventional weapons."

- From the very top came strict orders to inform members of the public about activities at America's Cold War air defense sites, as indicated in this 1958 statement by Secretary of the Army Wilber Brucker

[130] "Brochure Contents" (an untitled, typed document with no author), 23 June 1960, G3 Section, Organization Planning File, 1959, Briefings, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, CA., Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 29-30.

[131] United States Army Air Defense Command, "Missile Exhibit Attracts 75,000," *ARADCOM Argus* (May 1958) 5.

Public relations were equally as prominent in the Chicago-Gary Defense Area. During 1963, community relations conducted by members of the 45th Artillery Brigade included forty-eight speeches on Nike topics given by former Operation Understanding guests; two Operation Understanding trips for twenty-three area residents: eighteen parades and public displays of missiles: nearly forty parades by the Drum and Bugle Corps; ninety-four speeches delivered by Nike personnel; five "Nike in the Attack" viewings seen by 125,000 visitors; numerous meals prepared for orphaned and disadvantaged children; and countless Nike site tours.[132]

Not all public relations efforts began with ARADCOM personnel. "Operation Grassroots," conducted in July 1959, drew over 4,000 people to the Fairmont Hotel in San Francisco to view Nike equipment and to hear a related briefing. Developed by the owner of the Fairmont, Benjamin H. Swig, this public relations event also brought the governor and 400 civic leaders to the hotel for a lunch and air defense presentation. The event was so successful that similar outings were conducted in Colorado Springs, Sacramento, and Los Angeles. The Grassroots program also made its way into Bay Area schools. Titled "Nike Goes to School" and "Operation Education," this event demonstrated the way Nike missiles worked to students from eighth grade through college. This outing in turn prompted

[132] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, VI-13.

television station KQED to produce a television version titled *The Army's Nike - Operation Education*. After broadcasting the program three times, KQED then offered it to other interested organizations for their use.[133]

Figure 21

San Francisco television station KQED filming a simulated Ajax lift off for the program "Nike Goes to School."
Courtesy of U.S. Army

[133] "Brochure Contents" (an untitled, typed document with no author), 23 June 1960, G3 Section, Organization Planning File, 1959, Briefings, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, CA., Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 30-31.

Nike bases also appeared in motion pictures. The Army sponsored a television program titled *Big Picture* that publicized a wide variety of Army activities and equipment, to include Nike missile installations.[134] ARADCOM also produced a television program called *Count Down* for use by local stations and Bell Telephone produced a short film titled *The Nike Hercules Story*. While *The Nike Hercules Story* did not mention the nuclear warhead or booster drops of the Hercules, it did provide close up views of the missile system and clearly revealed how the system identified and destroyed targets, to include the actual firing of a missile.[135]

Even mainstream television and film featured the Nike. A 1961 episode of *Lassie* involved Timmy volunteering Lassie for Nike duty. When Timmy found out that his Collie could not become a Nike sentry dog because she was not a German Shepherd, Timmy adopted a Shepherd from the dog pound and trained it for the Army.[136] *Mannix*, *Mission Impossible*, and the movie *Escape from the Planet of the Apes* were partly filmed on Nike sites.[137] Shortly before Twentieth Century Fox began filming *Rally 'Round the Flag Boys!* Max Shulman's satiric twist on the protested installation of a Nike site in a small community, an explosion ripped through Nike site NY-53 in

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[134] United States Army Air Defense Command, "Army TV Shows Nike Alert Action by National Guard," *ARADCOM Argus* (November 1960) 15.

[135] *The Nike Hercules Story*, 30 min. (New York: Herbert Kerkow, 1958/59).

[136] United States Army Air Defense Command, "Lassie 'Offers Services' for Army Sentry Dog Duty" *ARADCOM Argus* (December 1960) 2.

[137] United States Army Air Defense Command, "Ape people, dogs, and bad guys like Nike sites," *ARADCOM Argus* (July 1973) 11.

Figure 22

Colonel Robert Brewer, Deputy Commander of the 47th Artillery Brigade in Los Angeles, breaks the news to *Lassie* that, despite her remarkable television accomplishments, she is not qualified to guard a Nike air defense missile site.
Courtesy of U.S. Army

Middletown New Jersey, killing ten. Stars Joan Collins, Paul Newman, and Joanne Woodward suddenly found the script changed to omit the comically explosive accident that ended Shulman's novel.[138] The Nike integrated fire control site at Fort MacArthur, California even had the honor of having Lee

[138] "'Trap' Roles Cast; Filming on July 7," *New York Times*, 11 June 1958, 40.

Majors (the bionic man) stage a break-in during an episode of *The Six Million Dollar Man*.[139]

Clearly, Americans did not have to possess bionic powers to know about or even gain access to America's Nike air defense missile system. Nevertheless, there is extremely limited public memory of these defenses, and extremely few Nike sites have been preserved, as discussed in chapter three.

[139] United States Army Air Defense Command, "'Bionic' man invades site to make weekly tv show," *ARADCOM Argus* (May 1974).

3 Gauging Public Memory and Historic Preservation of the Nike Air Defense Missile System

When CNN put together its highly lauded twenty-four episode television special and website on the Cold War in 1998, it made almost no mention of America's Cold War air defenses, even in episodes focused upon Sputnik, mutually assured destruction (MAD), and the nuclear freeze. The single exception, one episode on the Strategic Defense Initiative (SDI), mentioned no other American air defenses whatsoever, and treated SDI as a lone, failed air defense experiment. CNN simultaneously held a contest to write the quintessential Cold War novel for publication on this same website. Fourteen winning authors wrote one chapter each, describing well-remembered aspects of the Cold War such as a nuclear showdown, spies, and fear. No mention of air defense beyond one command and control center, used for both offensive and defensive purposes, was made whatsoever. A three thousand mile online journey to select Cold War destinations in the American southwest brings viewers to nine separate sites, none of which are Nike air defense missile sites, despite the fact that the route passes through two Nike defense areas. The stop at the Long Beach Navy Yard does not mention the Nike bases around the port that defended this shipping haven. Neither of the two stops in the White Sands Missile

Range mention that the range served as the principle testing facility for the Nike system. The perspective into Cheyenne Mountain does not reveal that this command center coordinated and tracked the efforts of every Nike site in the nation.[1]

Far from being an aberration, these public memory products reflect a peculiar characteristic of American public memory of the Cold War. Despite the significance and public awareness of America's Nike air defense missile system, public memory of the Nike network is almost nonexistent. Examination of a variety of public memory indicators, to include websites; popular and academic media; films; references in speeches; preserved Nike sites; and memorials/monuments reveals extremely little evidence of the Nike system in public memory. Considered alone, none of these indicators indisputably proves an absence of public memory, but taken together, the

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[1] Electronic searches of transcripts of each episode using the terms "air defense," "Nike," and "radar" reveal no instances of America's Cold War air defenses being mentioned, although Soviet and North Vietnamese air defenses are mentioned very briefly in three episodes. Episodes (in order) are: Comrades 1917-1945, Iron Curtain 1945-1947, Marshall Plan 1947-1952, Berlin 1948-1949, Korea 1949-1953, Reds 1947-1953, After Stalin 1953-1956, Sputnik 1949-1961, The Wall 1958-1963, Cuba 1959-1962, Vietnam 1954-1968, MAD 1960-1972, Make Love, Not War 1960s, Red Spring 1960s, China 1949-1975, Detente 1969-1975, Good Guys, Bad Guys 1967-1978, Backyard 1954-1990, Freeze 1977-1981, Soldiers of God 1975-1988, Spies 1945-1990, Star Wars 1980-1988, The Wall Comes Down 1989, Conclusions 1981-1991. [John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 30, 56, 59, 321, 464-471; CNN, "Cold War." [http://www.cnn.com/SPECIALS/cold.war/], accessed 27 December 2007.]

collective dearth of information on America's air defenses evident in these sources indicates extremely limited public memory of America's Nike air defense missile system.

The absence of Nike references and stops on this online tour also highlights the very limited preservation of Nike air defense missile sites in the nation. Of the five Nike sites listed in the National Register of Historic Places, none have been fully restored or even have plans in place to arrest the decay of all of their remaining components.[2] None of the sites have found a successful way to adaptively reuse the most character-defining feature of Nike sites: underground missile magazines. Only one site, SF-88 near San Francisco, is regularly opened and interpreted as a Nike site for members of the general public, despite the fact that all five of the sites remain federal property.

Between individual memory and history lies public memory: collective constructions and representations of the past. In his book *The Collective Memory* Maurice Halbwachs states that memory is a socially constructed notion. Memory is never "pure"; it is always shaped by experiences since the remembered event.[3] Like a chameleon that acts upon its surroundings as it changes its colors in response to those surroundings, public memory effects

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[2] Everglades National Park staff has developed a plan to stabilize most, but not all, of Nike Site HM-69's buildings. [Nancy Russell, E-mail to Author, 19 May 2008.]

[3] Maurice Halbwachs, *The Collective Memory* (New York: Harper & Row, 1980) 23.

and is effected by new events that shape or draw upon those memories, such as the preservation and interpretation of historic sites.

For this reason, gauging public memory is difficult. Defining whose public memory is being gauged is critical, since public memory of past events can be gauged in any group defined by nearly any characteristic. Even scholars who define public memory as contestations over representations of the past do, at some level, identify contestations by splitting their subject into groups and gauging their public memory. Even then, groups need not possess uniform public memories, nor must they have experienced events together. Indeed, groups may share public memories of events that they did not even live through, such as the Civil War, thanks to contemporary representations of the Civil War in a variety of media.

Since public memory may change with every new cue that shapes or draws upon those memories, media with wider circulations, such as films and newspapers, both reflects and effects public memory tremendously. The medium with the widest circulation in the United States currently, besides television and radio, is the Internet. Unlike television and radio, average Americans can “broadcast” content of their own creation online: content that can provide insights into public memory.

The Internet is a unique medium in American society, one especially important to inquiries into public memory. It can hold any form of information. Servers, telephone lines, inexpensive personal computers, web browsing

software, and website building software have all coalesced to provide the average American with the ability to inexpensively create his or her own website about virtually any subject. As of March 2007 over 70% of American adults used the Internet, according to the Pew Internet and American Life Project.[4] New personal computers cost as little as several hundred dollars, and used computers can be obtained for even less. Websites are available for free on some servers.[5] Dial-up Internet service can be purchased for around ten dollars per month. If these inexpensive and convenient ways of gaining Internet access are not enough, the proliferation of computers in the workplace and libraries makes it possible to own and maintain a website without even owning a computer.

These vernacular websites, created by average Americans, complement official and commercial sources of information available online such as governmental websites and online newspapers. Collectively, these Internet sources can provide insight into public memory as much if not more than commemorative ceremonies, museums, and preserved sites, since the latter three sources are developed by fewer individuals and are less accessible than the Internet.

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[4] The Pew Internet and American Life Project, "Percentage of U.S. Adults Online," [http://www.pewinternet.org/trends/Internet_Adoption_12%2005%2007.pdf], accessed 29 December 2007.

[5] Free Internet Websites, [http://www.freewebweb.com/en/index.html], accessed 29 December 2007.

Scholars are just beginning to consider the Internet as a repository for public memory. Certainly, not all web pages reflect memory, but taken collectively, the billions of web pages on the Internet can form the basis for inquiries into public memory of particular subjects. In his book *Remaking America: Public Memory, Commemoration, & Patriotism in the 20th Century,* John Bodnar probes into changes in commemorative ceremonies before and after World War II. Bodnar sees a continuous tension between official and vernacular forms of representation. Bodnar believes official cultural expressions arise when authorities bent upon social unity and loyalty to the status quo restate reality in ideal terms without exploring the complexities of memories. Vernacular cultural expressions occur when a constantly shifting array of specialized interests interpret memories derived from first hand experiences in local rather than national communities.[6] Although Nike sites were, and in many cases remain, owned by the federal government, the impetus and authority to commemorate history there is not necessarily an official cultural expression. The access of the Internet and relative ease with which websites can be created definitely provides fertile ground for vernacular cultural expressions, or public memory.

Comparatively few websites contain information about Nike air defenses. Of the eight billion plus web pages (at last count) the Internet

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[6] John Bodnar, *Remaking America: Public Memory, Commemoration, and Patriotism in the Twentieth Century* (Princeton: Princeton University Press, 1992) 13-15.

search engine *Google* scours, only 64,600 pages written in any language and located in the United States are related to the term "Nike missile." *Google* associates 3,700,000 American websites with "civil defense," though civil defense is a term not strictly relegated to the Cold War, and continues to be used to describe current defense activities to this day. *Google* associates 5,730,000 American websites with the term "Cold War," though the Cold War lasted much longer than Nike sites guarded the United States. The Vietnam War did not last as long, yet *Google* still associates fifty times as many American websites, or 3,250,000 pages, with this conflict.[7]

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[7] The results of Internet search engines must be considered carefully. Even though the searches conducted in this chapter were limited to American sources, they did not filter out web pages dealing with the Nike in foreign countries. Additional key words used in the search might have helped eliminate memories of Nike defenses in foreign nations, but the more terms used, the more opportunity there is for eliminating legitimate websites that only reference a filtered term once. Electronic searches, online and otherwise, can vary based upon a wide variety of factors besides key words and the other factors previously mentioned. The date the search was conducted, the specific search engine used, the use or absence of quotation marks, meanings associated with key word by writers, definitions of what constitutes a scholarly/academic journal versus a magazine, spelling errors, and optical character recognition (OCR) errors (in the case of scanned documents) all have an impact upon search engine results.

Given these factors, some explanatory notes are in order. These searches include evidence dating back to 1992, the date by which the Nike missile system, the Vietnam War, and the Cold War were acknowledged to be over in the United States. This helps ensure that articles deal with the subjects as memories, rather than contemporary events. Civil defense is the exception in this survey, since civil defense remains a contemporary concern, but since 2001 the term used to describe the military defense of the United States has generally been "homeland defense" and "civil defense" is more commonly associated with the Cold War era.

These searches were not designed to distinguish the number of articles written on specific subjects during different periods of time. That does

Popular and academic media generated in the United States also demonstrate relatively few associations with Nike missiles, compared to other Cold War topics. Since the beginning of 1992, *Facts on File World News Digest*, an archival record of news and historical documents, has included only one article associated with the term "Nike missile," 478 documents related to "Cold War," 1,090 documents correlated with the term "civil

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not mean this study assumes public memory of America's Nike air defenses has remained static since 1992. Public memory is constantly shifting, depending upon new cues that elicit memories, and is imbued with a diversity of content, intentions, and authors. Nevertheless, this study does not seek to identify the small constituencies and the even smaller variations in their public memory of America's Nike air defenses over time, as discussed in the introduction to this work. Much like stock indices, this study focuses upon a variety of sources that fluctuate at times but, considered collectively over time, demonstrate statistically significant trends.

Searches in this chapter were conducted during the same week using no quotation marks (i.e. a search for the term "Nike missile" involved typing nothing but the two words Nike missile into *Google)*. Quotation marks were avoided since their use in these searches might have eliminated sites heavily connected with slight variations in search phrases such as "Nike air defense missile" and "Vietnam Conflict."

This is not a foolproof data collection method. Even using quotation marks when searching for terms like "Cold War" can generate results not related to the Cold War but to wars in very cold climates when described on a website as a "cold war." It should also be noted that searches of American websites for the term "civil defense" do not guarantee that results will deal with Cold War civil defense, military defense, or even civil defense in the United States. Rather than surveying the results of multiple search engines and multiple ways of using key word searches, which would have produced sizeable statistics, this study simply uses these electronic search statistics to demonstrate the relative differences in references to a variety of subjects associated with the Cold War. These differences indicate far less public memory of the Nike system than other Cold War topics represented in official, vernacular, and commercial American websites. [Google, [http://www.google.com], accessed 29 December 2007.]

defense," and 563 articles associated with the term "Vietnam War."[8] *Proquest Discovery*, an online database of full-text articles from over 2,200 magazines, lists five articles related to the term "Nike missile," 15,495 documents correlated with "Cold War," 372 documents associated with the term "civil defense," and 8,131 articles related to the term "Vietnam War" published since the beginning of 1992.[9] *Gale Reference Center Gold*, a database of full-text and brief summaries of magazines, academic journal articles, books, news articles, and multimedia sources also lists stark contrasts between sources related to Nike missiles and sources related to other Cold War topics.[10]

Figure 23

	Magazines	Academic Journals	Books	News	Multimedia
Nike missile	11	1	0	19	0
Cold War	7295	4984	129	8194	1
Vietnam War	3655	957	92	4739	6
civil defense	1234	297	43	1316	0

Sources Related to Cold War Topics Listed in
Gale Reference Center Gold since January 1, 1992

[8] Facts.com, "Facts on File World News Digest," [http://www.2facts.com/], accessed 29 December 2007.

[9] Proquest, [http://proquest.umi.com/pqdweb?RQT=302&cfc=1], accessed 29 December 2007.

[10] Gale, "Gale Reference Center Gold," [http://find.galegroup.com/menu/start] accessed 29 December 2007.

Similarly, full text electronic searches of newspaper article content in American newspapers covered by *Proquest* reveal relatively little mention of Nike air defenses, at home or abroad, since the beginning of 1992.[11]

Figure 24

	New York Times	*Los Angeles Times*	*All national and regional newspapers covered by Proquest*
Nike missile	33	46	520
Cold War	12,174	11,300	104,776
Vietnam War	5,839	8,120	79,780
civil defense	469	622	11,742

Numbers of Articles on Cold War Topics in Select American Newspapers since January 1,1992

This analysis highlights the role of the mass media in public memory. Mass media does not dictate public memory but does promote and reflect collective constructions and representations of the present and past. As such mass media is a useful tool to analyze public memory in general terms. Marita Sturken's work *Tangled Memories* tries to break down public memory of the Vietnam War based upon the constructions and representations

[11] Proquest, [http://proquest.umi.com/pqdweb?RQT=302&cfc=1], accessed 29 December 2007.

Vietnam War movies used to portray the war over time. Her direct correlation between public memory and the content of these films ignores the fact that only a handful of individuals directed, wrote, and produced these films, and rejects the agency afforded to individuals to reject or accept media interpretations. Nevertheless, Sturken's correlation is not altogether inappropriate. She notes that, while films may be less complete and accurate than historical texts, their broader dispersion and influence upon younger generations with little knowledge of the subject matter increases the films' influence in public memory. Furthermore, her analysis highlights the way mass media both portrays and shapes public memory.[12]

While the Army and other organizations did produce public information videos about the Nike system, almost no popular films centered on nuclear war depict these defenses. The idea that short-range nuclear missiles could guard American cities by exploding over them seems to be ideal fodder for a film like *The Atomic Café*. Surprisingly, this film that thrives on evoking dark humor from Cold War video footage does not deal with Nike air defenses at all. This is perhaps the one and only example relevant to the discussion. While many extremely popular films about the Vietnam War have been made since the end of that conflict, relatively few films about nuclear war have been made since the closure of America's Nike air defense missile bases. Nuclear

[12] Marita Sturken, *Tangled Memories: The Vietnam War, the AIDS Epidemic, and the Politics of Remembering* (Berkeley: The University of California Press, 1997) 85-121.

war films in general rarely take a retrospective look since the most compelling aspect of nuclear war is the idea of what might happen to the viewer in the future if certain events transpire. These events are generally based upon advanced technology, which rarely looks advanced in retrospect. The absence of Nike defenses in nuclear war films such as *The Day After* and *WarGames* can be explained not by limited public memory but by the fact the movies were made and set in the early 1980s when Nike defenses no longer guarded the United States.[13]

The absence of Nike defenses in other Cold War films made after the Nike's watch had ended, such as *Red Dawn, The Hunt for Red October,* and even *Thirteen Days,* raises the question of exactly where the Nike system should appear in public memory, and where an absence of references to it has nothing to do with limited public memory.[14] Films such as these three, which focus upon a conventional (non-nuclear) Soviet attack on the United States, the defection of a Soviet nuclear submarine, and the attempt to prevent additional nuclear missiles from reaching Cuba, respectively, should not be expected to mention every aspect of the Cold War. Films that deal explicitly with nuclear war in the United States from 1954 to 1974, the period during which the Nike system guarded the contiguous United States in

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[13] *The Day After,* directed by Nicholas Meyer, ABC Circle Films, 1983; *WarGames,* directed by John Badham, Metro Goldwyn Mayer, 1983.

[14] *Red Dawn*, directed by John Milius, United Artists, 1984; *The Hunt for Red October*, directed by John McTiernan, Paramount Pictures, 1990; *Thirteen Days*, directed by Roger Donaldson, New Line Cinema, 2000.

general, should mention nuclear air defenses to some extent. Yet films portraying times when these defenses existed, such as *Dr. Strangelove, On the Beach,* and *Fail Safe,* do not mention Nike defenses, even though all three were made during the early 1960s, the height of America's Nike air defense missile program.[15] These films cannot be judged as products of public memory, due to their date of production. Films made during the time events transpired are not products of memory as much as they are interpretations of ongoing events. While they can be used to gauge perceptions of an event at a given time, an absence of a particular subject is not indicative of limited public memory of the subject, but a lack of knowledge of the subject, or a conscious choice not to include this aspect of life in the film.

The same holds true for speeches. Of course, the failure of any speaker to mention Nike air defenses in any speech does not necessarily indicate limited public memory of the Nike network. Still, some speeches lend themselves to historical air defense references more than others, especially speeches advocating anything but a complete reliance on deterrence to protect the nation from nuclear attack. The failure to mention this precedent

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[15] *Fail Safe* does mention fighter interceptor air defenses, but only when they are sent on a futile offensive, not defensive, mission to destroy American, not Soviet, bombers headed for Soviet territory. [*Dr. Strangelove or How I Learned to Stop Worrying and Love the Bomb,* directed by Stanley Kubrick, Columbia Pictures, 1964; *On the Beach,* directed by Stanley Kramer, Metro Goldwyn Mayer, 1959; *Fail Safe, d*irected by Sidney Lumet, Columbia Pictures Corporation, 1964; *The Atomic Café,* directed by Jayne Loader et. al., The Archives Project, 1982.]

in air defense related speeches since the end of the Nike's watch over the United States indicates and perpetuates limited public memory of this system. When President Ronald Reagan announced his Strategic Defense Initiative on March 23, 1983, he made no mention of Nike defenses, despite the fact that they were the only nationwide defense against air-delivered nuclear weapons the United States ever had. He did use historical references to bolster his argument.

> There was a time when we depended on coastal forts and artillery batteries, because, with the weaponry of that day, any attack would have had to come by sea. Well, this is a different world, and our defenses must be based on recognition and awareness of the weaponry possessed by other nations in the nuclear age.[16]

Reagan's omission of any reference to the Nike is surprising. On July 1, 1950, the Army Reorganization Act dissolved the Coastal Artillery and created the Army Antiaircraft Command (ARAACOM). This move formally acknowledged the succession of air power over naval forces as the dominant military threat to the North American continent. For twenty years ARAACOM's Nike air defense missile system served as the nation's primary

[16] "Address to the Nation on Defense and National Security March 23, 1983," *The Public Papers of President Ronald W. Reagan.* Ronald Reagan Presidential Library, [http://www.reagan.utexas.edu/archives/speeches/1983/32383d.htm], accessed 29 December 2007.

defense against aircraft carrying nuclear bombs.[17] Clearly, the Strategic Defense Initiative had far more comparable precedents than coastal artillery.

Admittedly, not every speech on missile defense needs historical references to air defenses oriented toward aircraft, but references to the Nike system could be used to support numerous and even contradictory positions for and against air defense. Surprisingly, references to Nike defenses are almost never made, even in nuclear air defense speeches. Of course, the presence of America's Nike air defenses did not stop the nuclear arms race. Such a fact would have strongly supported Walter Mondale's position against Reagan's air defense plan in a 1984 presidential election debate, yet neither politician mentioned the Nike.[18] When President William Jefferson Clinton addressed the Russian Duma on June 5, 2000, he discussed the impending vote on national missile defense to assuage fears over a renewed nuclear confrontation. He could have reminded the Soviets that the unilateral closure of hundreds of Nike sites and one anti-ballistic missile site previously in existence in the United States neither slowed nor accelerated the nuclear

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[17] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 3-5.

[18] "Debate Between the President and Former Vice President Walter F. Mondale in Kansas City, Missouri October 21,1984," *The Public Papers of President Ronald W. Reagan,* Ronald Reagan Presidential Library, [http://www.reagan.utexas.edu/archives/speeches/ 1984/102184b.htm], accessed 29 December 2007.

arms race, yet he did not.[19] When President George W. Bush announced plans to abandon the Anti-Ballistic Missile Treaty signed with the Soviet Union in 1972, he did not mention the existence of America's Nike air defenses at the time, instead characterizing the nation as completely defenseless against all nuclear weapons.

> We even went so far as to codify this relationship in a 1972 ABM Treaty, based on the doctrine that our very survival would best be insured by leaving both sides completely open and vulnerable to nuclear attack.[20]

The Anti-Ballistic Missile treaty only applied to anti-ballistic missiles, not Nike air defense missiles.[21] The United States dismantled these defenses unilaterally, and only several years after the signing of that treaty.

Nike service is remembered in memorials and monuments nearly as frequently as in speeches. Apart from a few inert Nike missiles on display at military museums and in public parks, the most significant example of a memorial or monument to Nike personnel is Guardian Park at Fort Hancock, New Jersey. Significant deterioration and numerous changes during a

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[19] "William Jefferson Clinton Address to the Russian Duma Delivered 5 June 2000," [http://www.americanrhetoric.com/speeches/wjclintonrussianduma.htm], accessed 29 December 2007.

[20] "Remarks by the President to Students and Faculty at National Defense University May 1, 2001," [http://www.fas.org/nuke/control/abmt/text/treaty-abm-010501.htm], accessed 29 December 2007.

[21] Federation of American Scientists, *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems,* May 26, 1972, [http://www.fas.org/nuke/control/abmt/text/abm2.htm], accessed 21 August 2008.

relatively short period of time challenge the idea that this site commands any sizeable presence in public memory, on or off of this former military reservation.

On May 22, 1958, an Ajax warhead exploded in the launch area of Nike site NY-53 in Middletown, New Jersey. The accidental blast triggered the detonation of seven other Ajax missiles that killed ten site personnel and sent fragments out in a three-mile radius.[22] Following the accident, surviving soldiers erected a granite memorial dedicated to the ten men killed. Two five-foot high concrete missiles flanked the memorial where it rested in front of the headquarters building at the launch area. The memorial remained in place from 1958 until 1963 when the Army closed this missile base. At that time the Army moved the memorial to the U.S. Army Air Defense Base in Highlands, New Jersey. The memorial remained there until Highlands closed in 1974. ARADCOM itself was closed a year later, but not before the 16th Air Defense Artillery Group moved the memorial to Fort Hancock and made it the centerpiece of Guardian Park, itself a memorial to the area's air defense personnel.[23]

This park memorializes lives lost in the worst Nike accident in American history, the shock of the first missile disaster in United States

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[22] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 380.

[23] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 4.

history, and the nuclear air defense of the nation's financial capital, largest city, and major east coast port.[24] Its physical deterioration speaks volumes about public memory of America's Nike air defenses. In less than twenty years NY-53's memorial was moved twice and incorporated into a larger memorial in an effort to assure its permanence. Instead of persisting, the

Figure 25

Dedication of a memorial to ten personnel killed onsite in the May 22, 1958 Nike Ajax explosion at Nike site NY-53 in Middletown, New Jersey
Courtesy of NPS/Gateway NRA

memorial was partially dismantled by National Park Service staff, Army personnel, and vandals, all during that same twenty years, until only about

[24] "Army Experts at Nike Site: Middletown Disaster Killing 10 First in History of U.S. Missiles," *Newark Evening News*, 23 May 1958.

one quarter of the original memorial components remained. Like most surviving Nike missile sites, the park deteriorated enough to make its original purpose nearly impossible to discern, leaving it hidden in plain site at one of the busiest intersections on Sandy Hook.[25]

The first component of Guardian Park was placed onsite several years before the park was dedicated. Around 1970 the Army erected a single Ajax missile in a concrete planter in the middle of the grassy triangle that serves as the entrance to present day Fort Hancock. The full development of the park site occurred concurrently with the closing of Nike bases throughout the region and the deactivation of the units whose soldiers staffed those bases, the 16th Air Defense Artillery Group and its subordinate battalions.[26]

For this closing ceremony on August 15, 1974, the 16th's three battalions, one from the Regular Army (RA), one from the New York Army National Guard, and one from the New Jersey Army National Guard, all participated. Guardian Park itself was dedicated to the men and women of the New York-Philadelphia Defense Area immediately following the 16th's deactivation ceremony.[27] Apparently, some of these Nike personnel sensed the end of an era and wanted to secure some place in public memory in the

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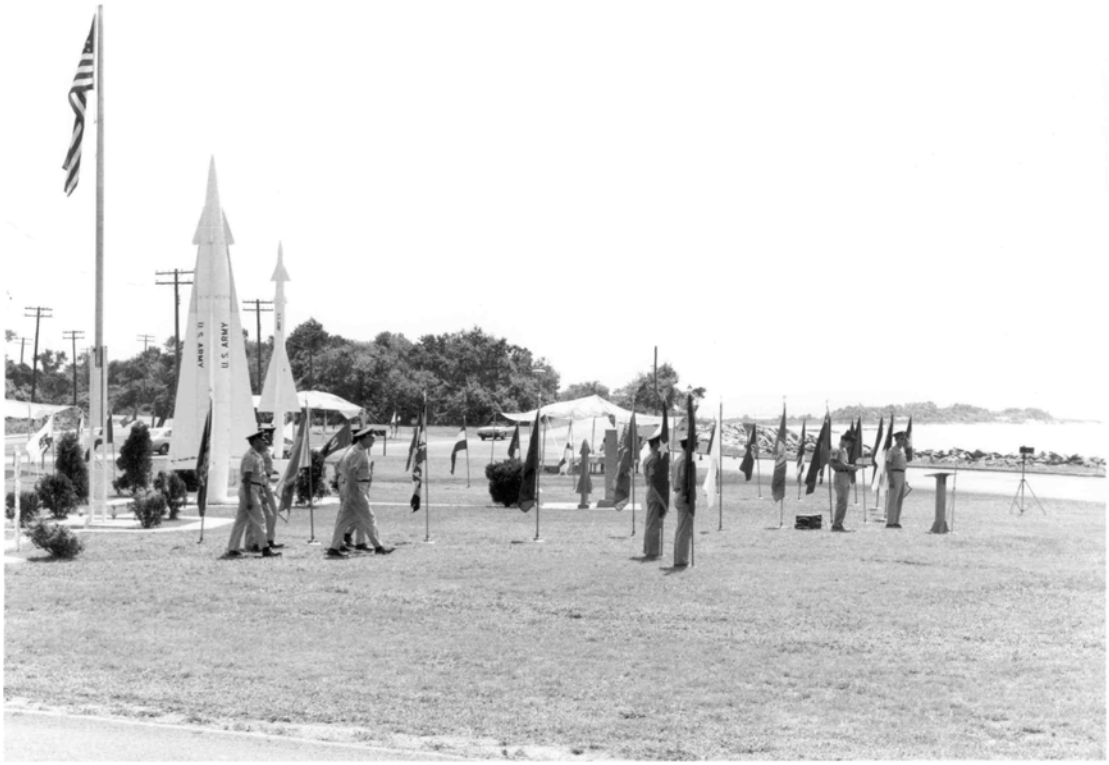
[25] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 2-4, 29.

[26] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 1, 8.

[27] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 1.

same way SF-88 was dedicated as a historic site before the site even ceased to be used for defensive purposes. Or perhaps the personnel were looking for some justification for their service, since their leaders felt no defense was better than their defense.

Figure 26



Dedication of Guardian Park at Fort Hancock, August 15, 1974.
Courtesy of NPS/Gateway NRA

The park included numerous pieces that rapidly succumbed to weather, vandalism, and a genuine absence of concern, both public and governmental, for the site. The park's 75 mm Pack Howitzer, used in the 16th closing ceremony, was removed by Fort Monmouth soldiers in 1977 or 1978.

Two five-foot high concrete missiles which once flanked the memorial to the ten personnel killed at Middletown essentially disappeared, one broken in half by vandals and the other removed by maintenance staff who eventually lost track of its location. A Hercules missile stood vertically in the center of a cruciform walkway. At the base of the missile a brass plaque, removed for safekeeping by park rangers in 1983, explained the history of the missile. The park also originally included shrubs of an unknown variety. Park maintenance staff removed those sometime between 1976 and 1980, replacing them with Autumn Olive bushes and seven wild rosebushes.[28]

Park staff repainted an Ajax missile placed in the park enough times to nearly blot out the black "U.S. Army" lettering stenciled on the missile. After the missile's base rusted and bent, a blizzard in March 1993 toppled the missile, and park staff removed the corroded artifact to museum storage for conservation. The missile's concrete planter lost its four metal unit insignia originally placed there by the Army. Three of the four were removed by museum staff following extensive vandalism. The fourth insignia was stolen.[29]

Like the Ajax missile, the Hercules missile in the park was repainted several times, obscuring the “US Army” designation on the missile. A severe

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[28] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 2-5, 29.

[29] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 2.

thunderstorm on August 10, 1979 blew off the missile's nosecone. Park staff replaced this in 1980 or 1981, moving the original nosecone to museum storage. A flagpole lasted even less time, removed between 1976 and 1979 by park staff and believed to have been installed elsewhere on Sandy Hook. This flagpole also had a plaque that briefly explained the evolution of the defense area. It was removed and placed in storage by park rangers in 1983. Within a decade it was officially declared lost, as was the concrete base upon which it once was mounted.[30]

By 2005 only about one quarter of the Park's original design components remained. All of these components badly needed restoration to ensure visitors had any clue as to the intent of the memorial, despite the fact that it stood at one of the most heavily trafficked intersections on Sandy Hook and Fort Hancock.[31]

The reasons for this demise are numerous. Weather and vandalism certainly played a major role, but these factors can only become serious once staff and the general public lose interest in a memorial like this. Certainly, the closure of ARADCOM and Fort Hancock itself removed military personnel with esprit de corps and substituted a few National Park Service staff members trying to manage a recreation area that extended across New York

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[30] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 3, 29.

[31] Erin Biddinger, “Guardian Park: A History, 1970-2003,” Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 5.

Figure 27

A severely deteriorated Guardian Park, June 2005
Courtesy of Author

Harbor. But even with the retention of military personnel, the park itself did not have a real reason for being. The deactivation of the defense area, not the units, was the impetus for the creation of the park that had informally had an inert Ajax missile on display in it for some time. The 16th Air Defense Artillery Group, which was the parent unit for the defense area, was headquartered at Highlands Army Air Defense Base. This base was not at Fort Hancock, but it was located extremely close to Fort Hancock. A Nike missile double battery was located at Fort Hancock, and the Fort was being

transferred to the National Park Service. Guardian Park was placed at Fort Hancock because it seemed to offer the longest life to a park dedicated to the area's missile defenses.[32] Given the two nearby Nike sites and the Missile Master computerized Nike control center also located at Highlands Army Air Defense Base, Fort Hancock was at least a theoretical nexus for a memorial.[33]

In reality, Guardian Park had little more to do with the 16th Army Air Defense Group than any other Nike missile site in the area and contained very disparate components. The Pack Howitzer, designed for use as field artillery, had nothing to do with air defense missiles, and was quickly removed. The park's vegetation seemed to be included as an afterthought and was replaced without concern for its significance. The four insignia originally mounted on the concrete planter in Guardian Park, interestingly, did not even include the insignia of the 16th Air Defense Artillery Group or any of the three battalions who dedicated the park following their deactivation ceremony on August 15, 1974. The insignia represented were those of the Army Air Defense Command, the Army Ground Forces, the 52nd Air Defense Artillery Brigade, and the 51st Air Defense Artillery. The 16th itself was fixed even less firmly than the park's memorial centerpiece, being deactivated, moved, and reactivated three times over the course of thirty years. Initially

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[32] Erin Biddinger, "Guardian Park: A History, 1970-2003," Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 2.

[33] "Missile Master Base Nearing Completion," *Red Bank Register* (New Jersey) 28 May 1959.

deactivated after World War II, the 16th was reactivated for Nike duty in Chicago in 1955, deactivated again in 1961, reactivated for Nike duty in New Jersey in 1971, and then deactivated in 1974.[34]

Even the land Guardian Park was placed upon was contrived, stolen from the ocean and filled with the forgotten foundation and artifacts of earlier conflicts. During 1898 and 1899 workers transformed what is now Guardian Park from a tidal marsh into solid ground by dumping sand taken from high ground to the north of the park. This high ground was used by British forces during the American Revolution and American forces during the War of 1812 as positions for gun batteries that guarded the southern portion of New York Harbor. To make a stable base for a road leading to new construction at the end of the point, workers also added to the fill a variety of surplus Army property to include wooden crates full of Civil War era Springfield muskets.[35] Nothing on Guardian Park tells this tale because memorials and monuments

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[34] The 51st and 52nd were probably listed due to their longer history as Nike units in that defense area. The Army Ground Forces plaque was probably included because it was the parent organization to World War II antiaircraft units, from which Nike units are descended. The reason for the inclusion of the Pack Howitzer on the park grounds is unknown. [Erin Biddinger, "Guardian Park: A History, 1970-2003," Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 2, 22; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 118.]

[35] Erin Biddinger, "Guardian Park: A History, 1970-2003," Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area, 2003, 27-28.

are supposed to radiate permanence and memory, not the use of earlier conflicts as filler for memorializing the concern of the day.

Figure 28

A restored Guardian Park rededicated May 21, 2006
Courtesy of Nike Historical Society

Surprisingly, Guardian Park was restored and rededicated on May 21, 2006, thanks to dedicated staff members and volunteers attempting to restore the Nike missile site located on Fort Hancock. All missing elements of the park, identified in a 2003 cultural resource study completed by a student intern, were returned to the site save the Pack Howitzer. Some items were replaced while others were taken out of storage and restored. The restoration included repairing and repainting the Hercules missile (to include the nose

cone that had blown off), restoring and replacing the original metal plaques and insignia, cleaning the sidewalks onsite, replacing the flagpole, and cutting back all vegetation.[36] Even with this restoration, the future of the site is shaky at best. Without the foundation of public memory and history that helps ensure both site managers and the general public care for this site of memory, the park runs the risk of being ignored or becoming filler for memorials dedicated to the next popular concern.

Nowhere is the displacement of Nike air defenses from American public memory more apparent than at Community Veteran's Memorial Park in Munster, Indiana, roughly nineteen miles from C-47, one of only three Nike sites individually listed in the in the National Register of Historic Places. This massive monument dedicated to veterans of twentieth century wars consists of various memorials to individual conflicts connected by a winding, immaculately landscaped path. The monument is not completely dedicated to "hot wars." One of the three World War II memorials is dedicated to the home front. The Cold War also merits space on the timeline that extends alongside the path, but the Cold War is listed as two finite periods from 1954 to 1963 (after the Korean War and before Vietnam) and 1976 to 1989 (after the Vietnam War and up to the fall of the Berlin Wall). Nike bases are mentioned

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[36] Lou Ventuto and Mary Rasa, "Guardian Park Memorial Restored." Vol 11, No 1 (Summer 2006) Ft Hancock, New Jersey: Sandy Hook Foundation, 2006, [http://sandyhookfoundationnj.org/pics/sp/spvol2no1/SandPaper606.pdf#search=%22%22guardian%20park%22%20missile%20restoration%22], accessed 2 September 2006.

nowhere, not even in a detailed audio tour available to guests, despite the fact that an extant Nike missile launch site can clearly be seen from the monument grounds roughly one third of a mile away. The site's blue cinderblock buildings are far more intact than the buildings at the Wheeler

Figure 29

Light blue buildings on a former Nike air defense missile site in Munster, Indiana sit ignored just beyond a massive memorial to America's military conflicts.
Courtesy of Author

Nike site, sitting behind what appears to be the site's original chain link fence, a sign warning of guard dogs, and a curious canine that trots out to the edge of the fence to meet visitors behind the gate. No trees grow through roofs or even encroach upon the well-maintained grass yard. The site, now used as a storage yard for heavy equipment and vehicles, is truly hidden in plain sight, as so many Nike sites are.

This is not to say these defenses are completely forgotten. Nike sites in particular command a kind of cult following made up of veterans of these sites, people fascinated with Cold War "ghost towns," and preservationists who closely link these sites to the ideal of a strong national defense.[37] The United States Army's Center of Military History in Washington, D.C. lists guidance for conducting research on Nike air defense missile sites on the portion of its website dealing with eleven of the most frequently researched topics.[38] Nevertheless these Nike sites, like other air defense sites, remain oddly absent from the collective constructions and representations of the past that are acknowledged by the majority of Americans.

This limited public memory is surprising. It is true that, in the twenty-first century United States, the name Nike is best associated with the athletic shoe company, but Nike sneakers were not sold until 1972, long after the

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[37] This assertion is based upon many conversations with volunteers trying to preserve Nike sites; observations of web pages devoted to these sites; and studying contemporary newspaper and magazine articles that deal with these sites.

[38] Center of Military History, United States Army, "Reference Topics," [http://www.history.army.mil/topics.html], accessed 10 February 2008.

Nike air defense missile system established itself as the most widespread air defense weapon system in the United States.[39] The Army named the Nike family of missiles after the Greek goddess of victory.[40]

Additionally, the prominence of companies instrumental to the Nike system remains memorable. Several hundred businesses in over twenty states produced some of the roughly 1.5 million individual parts that made up the Ajax's reusable control system.[41] Given the parts and services these companies subcontracted out, the Army estimated over one thousand businesses contributed to the Ajax.[42] Many of these firms not only continue to exist but also remain very well known. Bell Telephone, Goodyear, the Douglas Aircraft Company (now Boeing). DuPont, Chrysler, Glenn L. Martin (now Lockheed Martin), Sylvania, Honeywell, and the United States Rubber Company (now Uniroyal/Michelin) are just a few of the other American firms

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[39] Donald Katz, *Just Do It: The Nike Spirit in the Corporate World* (New York: Random House, 1994) 62.

[40] Initially, there was only one Nike air defense missile. The Ajax missile was titled Nike I until well after deployment began. Not until November 1956 was it renamed Nike Ajax (the name of a Greek Trojan War hero). The Hercules was originally titled the Nike B until this same time. ["Army Gives Missiles Mythological Names," *New York Times*, 30 November 1956, 15.]

[41] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 14-15.

[42] Department of Defense, Office of Public Information, "Fact Sheet, Nike Surface to Air Guided Missile," in "Public Relations-Nike" folder, Box XVIII-34, "Military Missiles and Space," Military Files, U.S. Army Corps of Engineers Office of History, Fort Belvoir, Virginia, 4.

Figure 30

Hundreds of different companies, many of whom remain prominent in the American economy, produced the Nike air defense missile system.
Courtesy of Los Angeles Times

that supplied Ajax components.[43] General Electric, U.S. Steel, the Fruehauf Trailer Company, Ingersoll (now Ingersoll-Rand, the parent company to Bobcat and Clark Equipment), Union Carbide, Kaiser Industries, and the Cummins Engine Company are other well-known corporations that helped develop Hercules components and maintain a strong presence in the American market to this day.[44]

Like the companies that produced the Nike system, Nike sites themselves have endured. As of 2002, 78-86% of all Nike air defense missile sites in the United States remained at least partially intact.[45] Yet few Nike sites have been designated as historic and fewer still have been preserved to any extent.

Five Nike air defense missile sites are listed in the National Register of Historic Places. Nike sites in Homestead, Florida; Fort Richardson, Alaska; and Wheeler, Indiana are listed individually. Nike sites at Fort Hancock, New Jersey and Fort Barry, California are listed in the National Register as part of

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[43] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 279-282.

[44] "U.S. Army Missiles Handbook," January 1960, In "Missiles" folder, Center for Military History, Washington, D.C., 54-56; Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 17-18.

[45] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-179.

historic districts. Fort Hancock is even a National Historic Landmark.[46] Only one of these sites has been substantially restored: SF-88 on Fort Barry, California, a National Park Service site, and the only one of these Nike sites regularly interpreted for members of the public. Even at this best example, the integrated fire control site sits vacant, slowly deteriorating, while the launch site welcomes visitors and interprets the history of America's Nike air defenses. The administrative site has been adaptively reused as a conference center, but is not part of any interpretive activities. The site only opens one of its missile magazines to the public.

Nike site C-47 in Wheeler, Indiana is deteriorating even more quickly that SF-88. Its integrated fire control site has been adaptively reused as a paintball course, but this reuse does not prevent substantial decay from plants, animals, and the weather, all of which have long since invaded every remaining building and structure on both the integrated fire control and launch sites. Preservation of the launch site was the focus of a non-profit group whose efforts apparently ended less than two years after the listing of the property in the National Register of Historic Places and the death of one of

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[46] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

the founding members of the organization. Neither portion of this site interprets the history of Nike defenses for members of the public.[47]

Nike Site Summit, which guarded Elmendorf Air Force Base and Fort Richardson, Alaska for twenty years, was listed in the National Register of Historic Places in 1996. The site is currently saturated with non-military communications equipment and is used roughly twenty times per year by troops conducting dog, mountain, and critical assault training, none of which includes Nike interpretation.[48] Nike site HM-69 serves primarily as storage space for equipment and historical collections at Everglades National Park, but no interpretation of the site's history occurs for members of the public.[49]

The double Nike site NY-56 at Fort Hancock, New Jersey, is part of both a National Register of Historic Places district and a National Historic Landmark. While volunteers are currently working to restore the site, the site is open to the public only intermittently, and their efforts are currently limited to the integrated fire control site. The administrative and launch sites slowly decay while serving as storage facilities for the National Park Service, hardly

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[47] Nike Preservation Group newsletters available online begin in October 1998 and end in October 2001. Site C-47 remains in the hands of the General Services Administration awaiting disposal. [Nike Preservation Group, *The NPG News: The Newsletter of the Nike Preservation Group* 3 (May 2000) [http://ed-thelen.org/npg-newsletters.html], accessed 10 April 2006.]

[48] Russell H. Sackett, Janet Clemens, and Joe Norrell, *Management of a Nike Site: A Feasibility Study for Management of Nike Site Summit, Ft. Richardson, Alaska* (Anchorage: Alaska Office of History and Archaeology, 1997) 7, 47-48.

[49] Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004, 7-1.

Figure 31

Adaptively reused administrative (top) and launch (middle) sites stand in stark contrast to the restored (but unused) integrated fire control site (bottom) at Fort Hancock, New Jersey
Courtesy of Author

fitting of contributing resources in a district listed as a National Historic Landmark.[50]

[50] Mary Rasa, Conversation with Author, 15 June 2005.

Yet the very presence of these Nike sites on the National Register conflicts with rules governing listing of historic resources in the Register. Specifically, Nike sites are simply too young to be qualified for this federal roster of preservation priorities.

To be considered historically significant (and therefore worthy of preservation) the National Register requires properties be significant, alone or as parts of districts of properties, in at least one of four criteria within a given historic context and possess integrity (the ability to communicate that significance).

Properties possess significance if they are properties:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of significant persons in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded or may be likely to yield, information important in history or prehistory.[51]

A number of criteria considerations apply to these categories. Very few are applicable to Nike installations, which are almost never cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved

[51] National Park Service, *How to Apply the National Register Criteria for Evaluation* (Washington: U.S. Government Printing Office, 1998) 2.

from their original locations, reconstructed historic buildings, or properties primarily commemorative in nature. The most relevant consideration involves properties less than fifty years old.[52]

The designations of all five Nike air defense missile sites listed in the in the National Register of Historic Places occurred well before any of the sites turned fifty years old, and far before the end of each site's period of significance.[53] Under current rules employed by the National Register, properties less than fifty years old or whose period of significance ended less than fifty years ago are not considered eligible for nomination to the National Register of Historic Places unless they possess exceptional importance, meaning that they are associated with an extraordinarily important event or are in a category of resources so fragile that survivors of any age are unusual.[54] This "exceptional" requirement is intended to ensure their significance will stand the test of time and is not simply a fad. The nomination

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[52] National Park Service, *How to Apply the National Register Criteria for Evaluation* (Washington: U.S. Government Printing Office, 1998) 25-43.

[53] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

[54] National Park Service, *How to Apply the National Register Criteria for Evaluation* (Washington: U.S. Government Printing Office, 1998) 41-42; National Park Service, *How to Complete the National Register Registration Form* (Washington: U.S. Government Printing Office, 1997) 42.

forms for all but two of these Nike sites indicate they possess exceptional importance, but the periods of significance of four of the five sites end far more recently than fifty years ago. Furthermore, the reasons evaluators declared all but one of the sites possessed exceptional importance are extremely limited. Being the best remaining Nike site in a state or defense area, subsisting as only one of two Nike sites in a state to conduct live fires of Hercules missiles, standing among the first Nike bases to deploy nuclear Hercules missiles, utilizing specialized design and construction methods required at all Nike bases in a particular state, or being the last element of a fort's national defenses before it was closed may have convinced officials to list these bases in the National Register of Historic Places, but these reasons provide highly ephemeral rationale for the amount of time, thought, and resources that communities and organizations must devote to the preservation of these sites.[55] Additionally, the majority of these sites do not

[55] Like the Nike site on Fort Hancock, SF-88 lies within a district listed in the in the National Register of Historic Places. The nomination forms that listed these districts on the National Register contain extremely little information about their Nike sites and do not state that the sites are exceptionally significant. Furthermore, Fort Barry's period of significance is listed as ending in 1949, before any Nike site existed anywhere, yet somehow Fort Barry's Nike site is included in this historic district. HM-69's nomination form makes the best argument for this Nike site's exceptional importance under criteria A (Events) and C (Architecture). It identifies the unique deployment, longevity, and operational cooperation (with HAWK batteries) of the site thanks to the proximity of communist Cuba and the unique architecture (i.e. above ground missile storage structures) required in this area with a high water table. It also notes that other Nike sites in south Florida possessed similar deployment, longevity, operational cooperation, and architecture and may also be exceptionally significant. Unfortunately, it does

Figure 32

First live fire of a Nike Hercules at Site Summit in Alaska. In the background are the above ground missile storage magazines characteristic of Nike bases in Alaska.
Courtesy of U.S. Army

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not compare this site to these others. [Harry Butowsky, National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District, 1982; Janet Clemens and Russ Sackett, National Register of Historic Places Registration Form: Site Summit, 1996; Thomas Lile, National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite, 12 December 1973; Don Peterson, National Register of Historic Places Registration Form: Nike Missile Site C-47, 1998; Diana Welling and Jennifer Dickey, National Register of Historic Places Registration Form: Nike Missile Site HM-69, 2004.]

conform to the U.S. Army's evaluation standards that exceptionally important properties less than fifty years old be nationally significant and none of the sites illustrate what is important in the Army's role in the Cold War in an extraordinary way.[56]

Significance statements justifying the historic designation and preservation of Nike bases rarely acknowledge the depth or breadth of the Nike's importance and do not make strong cases for the resource's extraordinary importance. Clearly, the Army felt the Nike system was historically significant at a very early stage. In November 1964, just a few months after the last Nike site in the United States ceased to use the missile, the Army donated a Nike Ajax missile to the Smithsonian.[57] Professional preservationists apparently agreed with this rapid prognosis. Before Nike site

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[56] These Army standards only apply to Army agencies evaluating properties, and they were not developed until 1998. Nevertheless, it is surprising to find that the National Park Service has not required more evidence of the exceptional importance of these Nike sites, especially given the relatively recent periods of significance of these sites. [Mary K. Lavin, *Thematic Study and Guidelines: Identification and Evaluation of U.S. Army Cold War Era Military-Industrial Historic Properties* (Aberdeen Proving Ground, Maryland: U.S. Army Environmental Center, 1998) 5; Harry Butowsky, National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District, 1982; Janet Clemens and Russ Sackett, National Register of Historic Places Registration Form: Site Summit, 1996; Thomas Lile, National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite, 12 December 1973; Don Peterson, National Register of Historic Places Registration Form: Nike Missile Site C-47, 1998; Diana Welling and Jennifer Dickey, National Register of Historic Places Registration Form: Nike Missile Site HM-69, 2004.]

[57] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 32.

SF-88 even closed it had been listed in the in the National Register of Historic Places, despite being less than twenty years old: far younger than the fifty year norm. The form that resulted in the nomination of SF-88 to the National Register not only claimed that the site possessed future historical value, it also stated that the site could not even be described in general terms on the nomination form since the installation was still active. Not only did the site make it onto the Register as part of this district, it did so during a time when the Army officially declared the system impotent and closed Nike sites to save money, relying upon the threat of overwhelming nuclear firepower, and perhaps mutually assured destruction, to deter Soviet attacks.[58] This example is emblematic of the way preservationists have neglected to explore and communicate the true depth and breadth of the Nike system's significance. Evidence from other National Register nomination forms used to justify listing Nike sites in the National Register portray similar laxity.[59]

It is not surprising that America's Nike air defense missile system evokes both minimal public memory and limited preservation. These two

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[58] Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973.

[59] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

characteristics are directly correlated. The limited preservation of Nike sites indicates limited public memory of America's Nike air defenses, especially considering the relatively large number of sites still in existence. Preservation of historic sites requires some public memory of the sites in question, for without some public memory the will to preserve and patronize such sites will not exist. Simultaneously, preserved historic sites also support public memory, providing critical cues for public memory and grounding that memory within a definable historical context, thereby helping to solidify the place of the event in public memory. This catch-22 means sites significant for their association with well-remembered events have a better chance of maintaining a public mandate for their preservation, which in turn bolsters public memory of these events. Correspondingly, sites significant for their association with poorly-remembered events have a worse chance of maintaining a public mandate for their preservation, which does nothing to bolster public memory of these events. Nike sites fall into the latter category. The next few chapters investigate the causes of this apparent amnesia by inquiring into the context in which Nike air defense missile sites are collectively remembered and preserved.

Context provides the foundation for preservation evaluations. Events do not happen in a vacuum, but are intertwined with larger actions and patterns. Being built in 1847 does not necessarily make a home significant. Being the first home constructed in a community and being highly illustrative

of the area's earliest residential development patterns would probably make that home significant within the context of the town's residential development. All communities do have larger trends important to their development. These historical contexts are the benchmark against which historical significance is measured by preservationists and the public alike. The next section investigates the contexts in which Nike sites have been remembered, and demonstrates how these contexts do not support the Nike's significance.

Part II

Context

"The significance of a historic property can be judged and explained only when it is evaluated within its historic context."

How to Apply the National Register Criteria for Evaluation, page 7

"The meaning of a historical book, film, or display is not intrinsic, determined solely by the intention of its creator, but changes as we actively reinterpret what we see and hear by placing it in alternative contexts derived from our diverse social backgrounds."

David Glassberg, *Sense of History*, page 9

4 The Dominance of Deterrence

At 9:30 PM on November 4, 1962, a Nike Hercules missile soared into the air over Johnston Island seven hundred eighty nautical miles west-southwest of Honolulu. The missile's high altitude nuclear blast produced a white flash too bright to view even with high-density goggles from the ground.[1] Army Captain Jim Whitaker, one of the Nike personnel responsible for firing the missile, remembered the shock wave knocking him to the ground.[2] Forty nautical miles south-southeast of surface zero, 367 sailors on board the destroyer USS Bausell had been ordered to face forward below deck, close their eyes, and lower their heads during the test.[3] In this prayerful posture, these personnel witnessed the only live fire of a Nike Hercules missile with an armed nuclear warhead and the last atmospheric nuclear test in the United States.[4]

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[1] Defense Nuclear Agency, *Operation Dominic I: United States Atmospheric Nuclear Weapons Tests Nuclear Test Personnel Review* (Washington, D.C.: Defense Nuclear Agency, 1983) 247-251.

[2] Jim W. Whitaker, Interview by John Porter, 26 August 2001, Interview GOGA-3171, videocassette (VHS), NIKE Missile Site SF-88L ADA Reunion Veterans Interviews, Golden Gate National Recreation Area Park Archives, San Francisco, California.

[3] Defense Nuclear Agency, *Operation Dominic I: United States Atmospheric Nuclear Weapons Tests Nuclear Test Personnel Review* (Washington, D.C.: Defense Nuclear Agency, 1983) 271-272.

[4] James Gibson, *The History of the U.S. Nuclear Arsenal* (Greenwich, Connecticut: Brompton Books Corp., 1989) 172-174.

Less than one year later the Soviet Union, United States, and Great Britain agreed to halt all nuclear weapons testing in the atmosphere, under water, and in outer space. No distinction was made in this treaty between low-yield nuclear tests for defensive weapons like Hercules missiles and high-yield offensive nuclear weapons tests. In much the same way, the merits of defensive Nike missile sites became lost amidst the growing concern over intercontinental ballistic missiles and the nuclear arms race in the 1960s and 1970s. Deterrence captured the imagination of the American public, politicians, and military leaders so completely that it replaced air defense, physically and symbolically. So powerful was this paradigm shift that deterrence continues to inhibit public memory of the Nike air defense missile system to this day.

The demise of the Nike was definitely not a foregone conclusion. The first ever launch of a long-range ballistic missile and satellite by the Soviet Union in 1957 certainly did not bode well for air defense missile sites oriented toward aircraft, especially since air defense sites were not designed to withstand ballistic missile attacks. Nike air defense missiles, however, proved to be quite adaptable. On June 3, 1960 the improved Nike Hercules system tracked and destroyed another Hercules missile. This was the first time in history that a missile had tracked and destroyed another guided missile.[5] At

[5] Earlier that same year a HAWK missile tracked and destroyed an unguided Honest John missile. [Mary T. Cagle, *History of the Nike Hercules*

MACH 3.5, the target missile was moving faster than any manned aircraft in existence at the time could travel.[6] The promise of developing an effective anti-ballistic missile seemed great, and the Army was already in the process of developing a third generation Nike missile to meet the challenge: the Nike Zeus.

The Army actually began developing an anti-ballistic missile before the first ICBM flight even took place. In 1955 the Army initiated work on the XLIM-49A Nike Zeus, an anti-ballistic missile based upon Nike Hercules technology.[7] Ironically, in January 1963, the same year ARADCOM reached its peak and shortly after the Nike Zeus conducted the first known successful intercept of a ballistic missile (July 19, 1962), Secretary of Defense Robert McNamara cancelled the Nike Zeus program before it could be deployed.[8] McNamara believed the Zeus could be overwhelmed by incoming missiles and that it might have difficulty differentiating real missiles from decoys.[9]

Weapon System, Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 173.]

[6] Headquarters, U.S. Army Air Defense Command, "Command Report, U.S. Army Air Defense, 1 Jul - 31 Dec 1961," Center for Military History, Washington, D.C., 34.

[7] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 112.

[8] United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 7.

[9] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 31.

These were not the only technical challenges faced by anti-ballistic missile designers. Intercontinental ballistic missiles (ICBMs) exit earth's atmosphere, reentering directly above their targets. Once locked onto their target, ICBMs use gravity and high-speed engines to shoot downward in a kamikaze manner. Anti-ballistic missiles (ABMs) flying horizontally and upwards against gravity must be relatively close to intercept plunging ICBMs successfully. Since ICBMs could enter the atmosphere anywhere, the nation needed anti-ballistic missile systems spaced regularly throughout the United States to protect the nation's entire population, infrastructure, and military capabilities. ICBMs could easily be targeted to areas without ABM sites since ABM sites could not be concealed. ABM systems used massive radar dishes. In addition to being very noticeable, this system infrastructure was highly vulnerable. One hit from even a conventional missile could render such a structure inoperative, leaving the ABM system unable to target incoming missiles.

In addition to technical challenges that slowed development of this missile, the economic feasibility of anti-ballistic missiles was questioned throughout the 1960s by activists, politicians, and military officials alike.[10]

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[10] "Nike Zeus Center of Disputes," 1 May 1960, in "Rocket/Military, U.S. Army, Nike-Zeus," *San Francisco Examiner* Clippings Files, San Francisco History Center Morgue, San Francisco Public Library, San Francisco, California; "Arms Slowdown," 7 March 1967, in "Rocket/Military, U.S. Army, Nike-Zeus," *San Francisco Examiner* Clippings Files, San Francisco History Center Morgue, San Francisco Public Library, San Francisco, California; "'McNamara A-War Peril,'" 3 May 1967, in

Since ICBMs were cheaper than ABMs, the United States would have to outspend the Soviet Union to produce enough ABM sites to destroy the extra ICBMs the Soviet Union could build. Equipping Soviet ICBMs with inexpensive decoys and chaff designed to attract and fool ABMs made the relative cost of ABMs even more expensive. By the late 1960s Soviet scientists were developing nuclear missiles with multiple independently targetable reentry vehicles (MIRVs). These hydra-like missiles could direct their multiple warheads at different targets. Experts estimated the Soviets could field MIRVs before America could deploy an ABM system. Additionally, the cost of placing ABM systems around America's cities would have been in the tens of billions of dollars. Even then, many major cities would have gone unprotected.[11]

Air defense deployments from the late 1950s to the mid-1970s demonstrate the difficulties American military and political leaders had developing a defense strategy capable of complementing deterrence. Nike Ajax and Hercules sites, initially positioned to defend urban areas, industrial centers, and conventional military assets, began guarding the deterring technology that they were designed to combat: long-range bombers and

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"Rocket/Military, U.S. Army, Nike-Zeus," *San Francisco Examiner* Clippings Files, San Francisco History Center Morgue, San Francisco Public Library, San Francisco, California; "Atom Base Called Threat to Chicago," *Chicago Daily News*, 20 November 1968, 1.

[11] Members of Congress for Peace Through Law Military Spending Committee, The *Economics of Defense: A Bipartisan Review of Military Spending*, Praeger Special Studies in U.S. Economic and Social Development (New York: Praeger Publishers, 1971), 54-57.

intercontinental ballistic missiles on and around Air Force Strategic Air Command (SAC) Bases. The Army began placing Nike installations around Strategic Air Command bases in the late 1950s, a time when the Army and Air Force fought bitterly for control of America's air defenses. While some SAC bases received four Ajax missile sites and even converted to Hercules-equipped defenses, defense areas centered on Strategic Air Command bases had, on average, the fewest number of Nike sites. When the Army began closing Hercules sites in the United States, the defenses around these bomber and missile bases were the first to go, making them generally the shortest-lived Nike defenses. To be sure, the military's commitment to defending these deterrents was not terribly strong to begin with. A fairly high percentage of Nike sites around SAC bases were surveyed and sometimes even built, but never activated.[12]

Over the next few years, even the most basic objectives of the nation's air defense strategy vacillated. As the number of active Nike sites around cities slowly began to dwindle, plans for anti-ballistic missile defenses centered first on protecting the nation as a whole; then key cities, industrial centers, and military bases; then Strategic Air Command bases alone; and, finally, one site around a North Dakota SAC base and one site around Washington D.C. After years of research, testing, and political wrangling,

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[12] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 44-179.

America's first and only ABM site began operating near Grand Forks, North Dakota on October 1, 1975. The next day Congress ordered the site shut down, deemed too vulnerable to nuclear attack and offering too little protection to merit continued operation. The planned site around the nation's capital was never built.[13]

The nation's failure to develop an effective defense against ballistic missiles caused a strategic shift from defense to deterrence. Naturally, the Army Air *Defense* Command found its existence in jeopardy. In 1973 Secretary of Defense Melvin Laird stated that the United States did not have a meaningful capability to limit damage to urban areas during a nuclear attack. In August of that year he issued a policy memorandum that oriented American defense objectives toward providing early warning of, rather than defending against, strategic bomber attacks. He ordered the phasing out of all of the remaining 48 Hercules batteries by the end of fiscal year 1976 except for the batteries of the 31st Air Defense Artillery Brigade located in Florida.[14] In a 1974 statement to the Senate, Secretary of Defense James Schlesinger agreed, declaring that, without an effective anti-ballistic missile

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[13] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 36.

[14] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 37.

system, an air defense missile system designed to combat Soviet bombers possessed little military value.[15]

The United States could have maintained its Nike air defenses. The Soviet fleet of two hundred bombers actually fluctuated in size very little between 1962 and 1981, but military planners believed the chances of any air defense missile site surviving a Soviet ICBM strike was slim.[16] Cost proved to be an added factor in ending America's Nike defenses. A November 1973 memorandum written by ARADCOM's Chief Information Officer identified two causes of ARADCOM's dissolution: a new focus on early warning of nuclear attack, as opposed to bomber defense, and cost cutting measures.[17] The Army estimated it would save approximately $115 million annually by deactivating ARADCOM, but these savings were hardly significant.[18] This

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[15] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 67.

[16] Kenneth Schaffel, The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960 (Washington: Office of Air Force History, 1991) 267-268.

[17] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 12.

[18] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case*

sum was a mere one half of one percent of the Army's authorized budget of $21.65 billion for fiscal year 1974.[19]

Nevertheless, the Army considered these cuts worthwhile. Indeed, expenses had been driving Nike cutbacks for some time. Evidence of this slow decline can be found in examining ARADCOM reorganizations. On the east coast, the Army merged the New York and Philadelphia Defense Areas in September 1966, eight years before the Defense Area was deactivated. Clearly, budget cutting and defense priorities dictated these moves. Both defense areas had possessed the Hercules missile for several years at that point, so the increased range of the Hercules clearly was not the rationale for combining the defense areas. Similar situations occurred in the Midwest, where the Milwaukee Defense Area merged with Chicago in 1968 but did not close until 1971, and on the west coast, where the battalion in charge of the Travis Defense Area moved to Fort Baker in June of 1971, assuming control of the San Francisco Defense Area and the last remaining firing battery in the Travis Defense Area.[20] While combining defense areas, the Army quietly closed Nike bases around the nation. By 1969 only 61% of the Hercules

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Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command, Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 25.

[19] Karl E. Cocke, *Department of the Army Historical Summary, Fiscal Year 1974* (Washington, D.C.: Center of Military History, 1978) 83.

[20] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 111, 117, 137, 153-158, 169-170.

batteries that had once been active remained.[21] By 1974 ARADCOM possessed only 48 Nike Hercules firing batteries, 39% of its 1963 peak.[22] In early 1974, the announcement was made that ARADCOM would be deactivated by June 30, 1975. Then the closeout was moved up to January 4, 1975.[23] "Vigilant and invincible" may have been ARADCOM's motto, but the Department of Defense, determining that ARADCOM was not invincible, ended its vigilance ahead of schedule. An accelerated closing saw no Hercules units outside of Alaska and Florida active in the United States after 1974.[24]

While cost certainly

Figure 33

"As I am sure you all know, this nation has no defense against either ICBMs or SLBMs. Once launched...we can only warn the national command authorities that an attack is underway and make the best assessment possible using the resources available to us...We can warn; we cannot defend against the missile threat."

- Excerpt of an address by General James E. Hill, USAF, Commander in Chief, NORAD to the Air Force Association Symposium in Los Angeles, California, October 26, 1978.

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[21] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 34.

[22] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 2.

[23] United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 10.

[24] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 38.

played a role in these closures, there were additional reasons. When the first temporary Nike site was established in 1953, there was a strong belief in the ability of the government and military to develop a reasonable nuclear strategy and protect the United States from attack. In general, the American public believed the United States had to stay ahead of the Soviets militarily. Stalin lived until 1953, continuing to direct heavy-handed repression in Eastern Europe and continuing to order improvements made to Soviet nuclear technology. In the years leading up to 1974 America experienced bitter infighting between branches of the armed forces, conflicts between military and scientific experts, failure in Vietnam, crime in Watergate, social unrest, and the economic doldrums of the 1970s. These experiences often shattered people's faith in government and experts. The inability of scientists and military planners to develop a cost-effective defense against intercontinental ballistic missiles was undoubtedly the dominant factor. More nuclear weapons, even defensive ones, seemed to make people less safe.

Yet there were distinct reasons to maintain ARADCOM's defenses. Soviet bomber forces remained at roughly the same level since the beginning of the 1960s; therefore no argument could be made that Nike bases were not needed. Certainly, Nike bases were vulnerable to attacks from intercontinental ballistic missiles, but destruction of existing Nike bases in an

Figure 34

From the people who brought you Vietnam:

The anti ballistic missile system.

They're mad.

They're absolutely mad.

Everyone can see that things at home are getting worse all the time, and that little or nothing is being done about it.

The last thing in the world we need is to spend six or seven thousand million dollars for the down payment on an anti ballistic missile system.

But what can you expect from the type of mind that got us into Vietnam in the first place, and that keeps plunging us back in for one-last-victory-try every time it looks as though we might finally extricate ourselves.

Mr. Nixon and Secretary Laird and their advisers in the Pentagon seem to have lost touch with reality.

There are bombs going off in our cities, but they're not coming from China or the U.S.S.R.

The air we breathe is being poisoned, but it's not being done by enemy agents.

Many Americans no longer believe what the Government tells them, but it's not because they listen to Radio Moscow.

The gold in Fort Knox is, for all practical purposes, no longer our own—but the job wasn't done by Goldfinger or Smersh.

The war and weapons people have become so obsessed with International Communism, they fail to see that they themselves are laying the groundwork for a state of home-grown anarchy.

A few observations on the A.B.M.

The figure they use is six or seven billion dollars. But this is just the well-known foot in the door.

Experience with Pentagon procurement in the past indicates that actual costs run two or three times the original estimate.

Furthermore, there is every likelihood that the "light" ABM system will get heavier and heavier as it goes along, and would ultimately cost over fifty thousand million dollars.

All this for a "Maginot Line in the Sky" (as the N.Y. Times described it in a recent editorial), that would most likely be obsolete by the time it is operative, and wind up as surplus electronic junk on Canal Street.

Meanwhile, back in the U.S.S.R. do you think "their" hawks would be standing still for this?

What can we do about it?

Unfortunately, the Pentagon doesn't seem to be able to learn from experience, but we wouldn't give up hope for the U.S. Senate.

There are a lot of Senators—including conservative Republicans—who feel they were "had" by the infamous Gulf of Tonkin resolution, and this time they don't seem to be buying the Pentagon's big public relations campaign on the A.B.M.

This thing can be stopped in the Senate. But it will take the kind of grass roots' effort that did so much to change the political climate on Vietnam last year.

Our marching song has come again.

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Name.....
Address.....
City.....State.....Zip.....
Make checks payable to **SANE**

A 1969 *New York Times* advertisement paid for by the Society for a SANE Nuclear Policy illustrates how national distrust of military experts crested over Vietnam and swamped America's air defenses.
Courtesy of Peace Action

attack would have required a significant number of ICBMs.[25] Nuclear arms limitation treaties did not force America's hand. Neither phase one nor phase two of the Strategic Arms Limitation Treaties (SALT) required the United States or Soviet Union to destroy nuclear air defense missiles.[26] The United States could have saved these defenses, but it did not.

At this highly symbolic point the United States completely embraced deterrence, throwing its largest shield into the fire rather than preserving the Nike air defense missile system. Years of critical remarks about the effectiveness of these defenses issued by none other than the Army and Air Force helped pave the way for the demise of America's air defenses.

The Army wasted no time eliminating Nike units, taking no more than six months to phase out firing batteries.[27] The final closure of forty-eight Nike

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[25] Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 38.

[26] *Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms*, May 26, 1972 [http://www.fas.org/nuke/control/salt1/text/salt1.htm], accessed 21 August 2008; *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Strategic Offensive Arms, Together with Agreed Statements and Common Understandings Regarding the Treaty,* June 18, 1979 [http://www.fas.org/nuke/ control/salt2/text/salt2-2.htm], accessed 21 August 2008; *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems*, May 26, 1972 [http://www.fas.org/nuke/control/abmt/ text/abm2.htm], accessed 21 August 2008.

[27] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of*

bases caused the Army to transfer 5,200 active duty soldiers, reassign or retire 4,800 National Guard personnel, and eliminate 1,200 civilian contractor positions.[28] ARADCOM's official periodical did, however, state that civilian contractors who wished to remain in service with the Army would be given as much assistance as possible finding new jobs and homes. Active duty soldiers who had to remain in service were able to list preferences of where they wanted to serve, since some units, including ones in Alaska, Florida, and overseas, still used the Nike.[29]

Closing Hercules sites down may have been hardest for the security staff on Nike sites. With the deactivation of ARADCOM, 188 sentry dogs lost their jobs and were reassigned elsewhere if they were less than nine years old and in good health. Dogs over nine years old or in poor health were euthanized as there was no way to retrain them to be pets.[30] Handlers who had raised their dogs since they were puppies begged their superiors and

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the Inactivation of a Major Army Command, Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 30.

[28] "Nike Bases, Defense Command in Marin Will Shut Aug. 31," *Marin County Independent-Journal*, 4 February 1974.

[29] United States Army Air Defense Command, "General Shoemaker cites ARADCOM's fine record, urges high spirit, determination continue," *ARADCOM Argus* (February 1974) 13.

[30] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 30.

petitioned congressmen to make exceptions to this policy, all to no avail. The Army trained these dogs to attack, and the Army did not want the liability of having them possibly maul someone in the future, outside of any mauling required by a new assignment as a guard dog.[31]

Figure 35

Nike Hercules site sentry and dog
Courtesy of U.S. Army

The deactivation of ARADCOM did not mean a complete end to Nike missile units. An air defense artillery brigade with Hercules and HAWK

[31] Susan Cheney, Interview by John Martini, 9 May 1993, Interview GOGA-18808, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 18.

missiles continued to exist in Florida to guard against air attacks from the nation's closest communist neighbor: Cuba. Nike sites assigned to a Hercules battalion in Alaska also remained active due to their relatively close proximity to the Soviet Union. Additionally, Hercules air defense missile sites assigned to the U.S. Army continued to operate in other parts of the world, but were assigned to smaller commands. Army divisions stationed in the United States continued to possess other air defense systems, such as Chaparral, Vulcan, and Redeye systems, but rather than guarding the United States continuously, these units kept their air defense equipment ready for deployment elsewhere. A wide variety of allied nations continued to use the Nike system as well: West Germany, Japan, Norway, Taiwan, South Korea, Spain, Turkey, Greece, the Netherlands, Belgium, France, Italy and Denmark.[32]

Deterrence not only replaced air defense, it continues to inhibit public memory of the Nike air defense missile system to this day. Deterrence became a totem, a sacred figure or universal protector born when leaders destroyed air defense. While Sigmund Freud's use of this theory in his 1913

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[32] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 13-14, 17-18.

Totem and Taboo deals with a prehistoric tribal society, his theory can readily be applied to Cold War America. Totemism, or the symbolic substitution of one social model for another, relies upon the replacement paradigm to explain significant incongruities between the two situations. The new model effectively accomplishes this task by symbolically reproducing the system that it replaces in the form of a totem.[33] When the nation's newly created Department of Defense could not defend the nation against the most powerful weapon ever invented or even halt the production and stockpiling of these nuclear munitions, the nation's leaders eliminated air defense and replaced it with a totem: deterrence. Deterrence had coexisted with air defense for some time. Leaders initially noted how the two approaches complimented each other. In the early 1970s, the nation's leaders acted to eliminate air defense, unilaterally deactivating nearly all Nike sites in the United States and slashing radar and jet interceptor forces. Far beyond simply declaring that deterrence alone could defend the nation, they actually convinced the American public that the maintenance or construction of air defenses would only make the nation less safe by encouraging an acceleration of the nuclear arms race! Deterrence became both a universal protector and a sacred figure that Americans were not permitted to eliminate or reduce with air defense. Even Ronald Reagan's attempts at nuclear air defense in the early 1980s met with

[33] *The Basic Writings of Sigmund Freud* ed. trans. A.A. Brill (New York: Random House, 1966) 884-890, 918.

strong resistance from the same people who protested America's nuclear deterrent.[34]

Beyond the demise of nuclear air defense, this totem represents a larger abandonment of responsibility for public safety by the federal government from the potential military effects of the Cold War. Initially taking charge of civil defense, the federal government quickly backpedaled, shifting responsibility to local governments and even individuals years before air defense experienced this federal abandonment. Early civil defense efforts on the part of the federal government quickly shifted from protecting the public from a nuclear attack to convincing the American people that they could protect themselves through backyard shelters, stockpiling of supplies, and even duck and cover drills.[35] In a war with no front, where civilians were arguably as much at risk as military personnel, the federal government drafted the American public to solve defense dilemmas that the best defense experts could not resolve.

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[34] An article that examines the origins and controversy behind the Strategic Defense Initiative is "Reagan's Star Wars Bid: Many Ideas Converging," *New York Times*, 4 March 1985, A1. It notes how opponents felt the clear aim of the program was not defense but military superiority. Opponents and proponents alike noted that SDI would destabilize the status quo for better or worse, depending upon their perspective.

[35] Oakes and Grossman label this federal propaganda effort "emotion management." Tribal management of emotions is precisely Freud's totem. [Guy Oakes and Andrew Grossman, "Managing Nuclear Terror: The Genesis of American Civil Defense Strategy," *International Journal of Politics, Culture, and Society* 5, no. 3 (1992): 393-395.]

The totem of deterrence worked, and continues to work. In a February 1957 preview of the announcement that the Army would begin using nuclear air defense missiles, the Secretary of Defense noted the effectiveness of the weapons both in defense and deterrence.[36] Yet a November 1973 memorandum written by ARADCOM's Chief Information Officer explaining the closure of nearly all Nike air defenses in the United States stated that deterrence would ensure the nation's safety, as well as limited early warning and interceptor capabilities, after ARADCOM closed.[37] Certainly, all weapons have a way of deterring attacks, but Nike missiles were clearly defensive in nature. Whether the Nike network was a defense or deterrent remains a conflicted notion even for military veterans and historians interpreting former missile sites. In interviews with the National Park Service staff at SF-88, numerous veterans felt Nike air defenses provided both a strong defense and deterrent, and they were not alone.

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[36] Commanding General, Army Antiaircraft Command, Ent Air Force Base, Colorado, Memorandum "To All Units, Commands, PI Message Number 55, Release Nuclear Weapons Item and Fact Sheet," 18 February 1957, AG Central Files, 1957, Publicity, Box 2, Records of the 6th Region, Air Defense Command, Ft. Baker, CA, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 3.

[37] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 10.

Four other Nike air defense missile sites besides SF-88 are listed on the National Register of Historic Places. All five of these Nike sites rely upon the sites' association with historically important events (National Register criterion A) to justify their significance. Those significance statements reflect the totemic transition from defense to deterrence. Some significance statements rely upon the importance of the Nike's defensive posture, yet the bases were never used in combat. Other statements rely upon the sites' contributions to deterrence, yet all but a handful of Nike sites survived for even less than one-half of the Cold War and were closed as a cost-cutting measure long before the conflict ended.[38] Both rationale are partially correct, yet without identifying and explaining the totem, neither fully explains the Nike's significance.

Nike sites are not unique among Cold War resources in this manner. Even some preservationists preserving offensive intercontinental ballistic missile sites and National Historic Landmarks, the highest level of historic designation in the United States, have not seen through this totem. Public Law 106-115, passed in 1999, created the Minuteman Missile National

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[38] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

Historic Site, a National Historic Landmark in South Dakota. The purpose of the park, according to the law, is, "To preserve, protect, and interpret for the benefit and enjoyment of present and future generations the structures associated with the Minuteman II missile defense system..." and "...to interpret the historical role of the Minuteman II missile defense system as a key component of America's strategic commitment to preserve world peace…"[39] This surface-to-surface missile had nothing to do with defense! With a range of 7,021 miles and a warhead that varied in size from 1 to 2 megatons, the Minuteman II may have deterred the Soviet Union from attacking the United States, but only because it represented the massive retaliatory capabilities of the American nuclear arsenal. It had no defensive capabilities.[40] The study goes on to incorrectly label strategic bombers, submarine launched ballistic missiles (SLBMs), and land-based intercontinental ballistic missiles (ICBMs) as America's triad of nuclear defense, rather than the deterrent that they were. Additionally, the study does not mention Nike air *defense* missile sites at all, despite the fact that there

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[39] Jeffrey A. Engel et. al., "The Missile Plains, Frontline of America's Cold War: Historic Resource Study, Minuteman Missile National Historic Site, South Dakota" (Omaha, Nebraska: National Park Service, Midwest Regional Office, 2003) [http://www.cr.nps.gov/history/online_books/mimi/hrs.htm], accessed 2 September 2006.

[40] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 241-242.

were four Nike bases that defended this and other ICBM sites around Ellsworth Air Force Base until 1961.[41]

Like historians and military veterans, the American public continued to succumb to the totemic substitution of deterrence for defense long after the federal government abandoned responsibility for civil and air defenses. A 1986 study of public opinion polls and methodology found most Americans relatively unconcerned with nuclear war, believing it would not happen or would only happen after their lifetime. Researchers noted that these opinions remained constant, regardless of whether open or closed questions were used; irrespective of recent events; and in spite of whether questions referred to the nation or the world.[42]

Nuclear weapons induced other strange dichotomies. The unprecedented power of nuclear weapons came with a surprising degree of fragility. Many highly skilled military personnel required extensive equipment and a carefully controlled environment to ensure nuclear weapons would even work. The Army considered painting Nike Hercules missiles camouflage to help conceal them, but the heat absorbed by the missiles even while in storage on the ground approached 185° F, the maximum heat the missile

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[41] Jeffrey A. Engel et. al., "The Missile Plains, Frontline of America's Cold War: Historic Resource Study, Minuteman Missile National Historic Site, South Dakota" (Omaha, Nebraska: National Park Service, Midwest Regional Office, 2003) [http://www.cr.nps.gov/history/online_books/mimi/hrs.htm], accessed 2 September 2006.

[42] Howard Schuman et. al., "The Perceived Threat of Nuclear War, Salience, and Open Questions," *The Public Opinion Quarterly* 50 (Winter 1986): 519, 533-535.

guidance set could possibly be subjected to without overheating. The Army ended up painting the missiles white specifically to minimize the solar heat absorbed by the missile in both storage and operation.[43] This made America's Nike air defenses all the more apparent to passers-by, whether on the ground or in the air. The fragility of nuclear weapons left one major segment of America's nuclear air defenses exposed when they would have been better concealed. Even more surprisingly, the sensitivity of offensive nuclear weapons meant that the nation's primary deterrent to nuclear war needed to be hidden to ensure it maintained its retaliatory capabilities! Of course, masking the presence of a deterrent significantly diminishes the deterring capabilities of the weapon unless an adversary conducts extensive intelligence gathering, which the nation also tried to prevent.

The terrible potential inherent in nuclear weapons and the world's reluctance to use them, two keys to deterrence, created a situation where civilians regularly advised the military on matters of military strategy. Most generals had never experienced nuclear war, so civilians, in a sense, became considered experts as much as military personnel.[44] Having Army and Air Force experts constantly criticizing the other service's air defense capabilities

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[43] R.G. Simpson and C.M. Thompson [Bell Telephone Laboratories, Inc.], *Final Report, Engineering Services Memorandum Battalion-51: Investigation of the Effect of Missile Camouflage Paint on the Operation of the NIKE-HERCULES Guidance Set*, No date, In "Camouflage (concentration: oversized files; miscellaneous)" box, Office of History, Fort Monmouth, New Jersey, 1.

[44] Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960) v.

certainly did not help convince the public that the military was more qualified than civilians when it came to nuclear strategy. Yet neither military nor civilian leadership proved capable of developing a feasible way to use offensive nuclear weapons in ideologically driven conflicts, whether cold or hot. Policies like Eisenhower's "New Look" relied upon terrible, nuclear-driven outcomes, but its replacement, Kennedy's "Flexible response," provided its own confusing array of horrors. One anonymous Army major's explanation of the destruction of a South Vietnamese provincial capital, "It became necessary to destroy the town to save it," sounded disturbingly analogous to expert explanations for abandoning the defense of urban centers to instead protect the most powerful weapons ever created, and then abandoning air defense altogether.

The nation's reliance upon offensive intercontinental ballistic missiles to deter attacks and defend the nation dramatically reduced the flexibility American deterrence possessed earlier in the Cold War when offensive forces included a more balanced mix of nuclear missiles and bombers. The only advantages ballistic missiles have over bombers are that they are faster and less vulnerable to active defenses. Bombers and their crews are really far more versatile since they are recallable; can make split second decisions like aborting missions or looking for targets of opportunity; and can be employed during peacetime. To their credit, both the United States and Soviet Union retained small bomber forces throughout the Cold War, but both

clearly relied upon intercontinental ballistic missiles. The United States also maintained a fighter-interceptor force long after Nike air defense missile bases closed due to the flexibility jet aircraft offered. The speed of missiles grows far less useful after the first strike, at which point survivability and reliability become paramount. Finally, missiles are only better than bombers at evading defenses if the defending nation has a complex, expensive air defense system, which the United States eschewed when it ended the Nike's vigilance.[45]

Army and Air Force officials who had spent years criticizing each other's air defense systems had made it clear that defending a nation against any air attack, whether it utilized missiles or not, was extremely difficult. Rather than building the best possible air defense system, the United States abandoned air defense because it was less that 100% guaranteed.

In the long run, the effectiveness of the totemic transition between air defense and deterrence did prevent a nuclear conflict and even contributed to the so-called American victory in the Cold War. If the United States won the Cold War by being able to outspend the Soviet Union, it abandoned that strategy when it came to air defense. The nation did not invest massive amounts of money in the active and passive air defenses required to protect all citizens from nuclear attack. Instead, the government nearly stopped spending money upon air defense entirely and embraced the idea that

[45] Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960) 100.

overwhelming offensive forces could protect the nation even while they threatened the existence of life on the planet.

This logic was predicted by what is arguably the most powerful nuclear war film ever made. *Dr. Strangelove or How I Learned to Stop Worrying and Love the Bomb d*epicts scientists and military leaders maniacally developing ever more destructive technology in an effort to guarantee victory against their Cold War rival, with little regard for the fate of the world. Midway through the film the Russian ambassador to the United States announces that the Soviet Union has developed a doomsday device capable of destroying the world, to be used if attacked with nuclear weapons. Peter Sellers, playing American President Merkin Muffley, questions the ambassador's sanity and demands to know why they would build such a device. The ambassador replies,

> There were those of us who fought against it, but in the end we could not keep up with the expense involved in the arms race, the space race, and the peace race. At the same time our people grumbled for more nylons and washing machines. Our doomsday scheme cost us just a small fraction of what we had been spending on defense in a single year. The deciding factor was when we learned that your country was working along similar lines, and we were afraid of a doomsday gap.[46]

Unfortunately, the Soviet leaders in this film neglected to announce the capabilities of this deterrent to the rest of the world until the planet's destruction from this deterrent to nuclear war was imminent. Sadly, this

[46] *Dr. Strangelove or How I Learned to Stop Worrying and Love the Bomb,* directed by Stanley Kubrick, Columbia Pictures, 1964.

farcical logic proved to be all too similar to reality, and the transition from air defense to deterrence helps explain the limited public memory of America's Nike defenses.[47] But deterrence alone cannot fully explain this situation. The next two chapters reveal additional causes of this lapse.

[47] While Herman Kahn did hypothesize about a doomsday machine in *On Thermonuclear War*, I am referring to a nation's reliance upon a hidden deterrent (ICBMs) as the rough equivalent of relying upon a doomsday machine that a nation fails to disclose to its enemies.

5 The Nike Network and Cold War Narratives

On April 15, 1955, Ray Kroc opened his first McDonald's restaurant in Des Plaines, Illinois.[1] This sleepy community had been around since the mid-1800s but boomed into a full-fledged suburb of Chicago in the years following World War II.[2] McDonald's was not the only franchise to locate to Chicago's northern suburbs. One month earlier, the U.S. Army began guarding Chicago with suburban Nike Ajax missile sites, including one in Arlington Heights less than ten miles away from Kroc's restaurant.[3] In an age when McDonald's was still making its initial foray into the fast food franchise, the Army was one step ahead. By the end of 1956, when McDonalds had a mere fourteen restaurants and $1.2 million in sales, the Army had "franchised" over two hundred Nike air defense missile sites, each costing over $1 million just to build, around the nation.[4]

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[1] McDonald's Canada, "McDonald's History," [http://www.mcdonalds.ca/pdfs/history_final.pdf], accessed 21 January 2007, 2.

[2] *Encyclopedia of Chicago,* "Des Plaines, IL," [http://www.encyclopedia.chicagohistory.org/pages/376.html], accessed 1 March 2008.

[3] While the Army placed most Nike sites in up and coming suburbs, Chicago did have a number of urban Nike sites on the shore of Lake Michigan due to the lack of dry land directly east of Chicago. [Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 60-67.]

[4] McDonald's Canada, "McDonald's History," [http://www.mcdonalds.ca/pdfs/history_final.pdf], accessed 21 January 2007, 3; Stephen P. Moeller, "Vigilant and Invincible," *ADA* (May-June 1995) 20.

The similarities between Nike sites and fast food franchises in general are eerie. Both sprang up in the early post-war years. Each relied upon standard architectural plans to create a recognizable design. Uniformed McDonald's and Army personnel both invaded and sprang from the communities where these franchises located, bringing economic benefits and real-world costs. Operations at both Nike bases and McDonald's restaurants were highly regulated to ensure uniformity with operations on similar sites around the nation. The standardization of architecture, equipment, and operations on Nike bases far removed from each other provided an interchangeable, predictable service, with millions and millions served, at home and around the world. In response, the American public simultaneously appreciated air defense while contesting the placement of air defense missile bases in their community, foreshadowing the effect McDonald's would have on American communities years later.[5]

Nike sites are not likely to appear in studies of franchization any time soon, and understandably so. While there are numerous similarities between fast food franchises and these small military bases, air defense missile sites are not for-profit organizations dedicated to meeting consumer demand and

[5] Although all Nike sites had to have the same equipment (given the system in use at the time), the exact layout of each site differed slightly given the terrain, location of the base, and other factors. Nevertheless, the interaction citizens had with these bases was standardized in the same way citizens can expect certain things in their interactions with franchise restaurants like McDonald's that may vary slightly in terms of layout and appearance.

initiated by owner-investors with a baseline level of capital and a proven management record. The absence of the Nike system from historical narratives describing the spread of franchises is therefore understandable. Far more peculiar is the absence of Nike bases in historical narratives of the Cold War. Nike sites remain outside of Cold War narratives because they do not fit into other major themes besides deterrence that historians routinely use to characterize the Cold War: secrecy, the Second Red Scare, and the space and missile race. A fourth theme that depicts the Cold War Army as a low-tech fighting force, thanks in large part to conflicts in Korea and Vietnam, does not accurately represent what is the Army's most successful adaptation to Eisenhower's nuclear-centric "New Look": the Nike air defense missile system.

While Nike sites are highly emblematic of well-documented trends in Cold War America, Nike sites also defy Cold War stereotypes in a number of ways. Nike sites were far from secret. The Army continuously ran public relations campaigns to convince Americans that nuclear missiles placed in populated areas and designed to explode over major cities were necessary and even beneficial. Competition to field a land-based air defense missile system in the United States fueled a bitter public debate between the Army and Air Force that further highlighted the presence of Nike missile sites and caused the services to reveal missile performance data in an effort to prove the superior capabilities of their systems. Americans were also unafraid of

opposing military efforts designed to thwart Soviet attacks. Unbowed by communist witch hunts during the Second Red Scare, Americans routinely contested the placement of Nike sites in their community. The Soviet focus on developing rocket technology that could send massive payloads aloft brought them tremendous coups in the space and missile race. An American focus on smaller payloads and engines, such as in Nike missiles, remains overshadowed in an age best remembered by Sputnik I and the world's first intercontinental ballistic missile. The absence of Nike sites from Cold War narratives centered on these events and themes partially explains how the Nike air defense system retains such a very low profile in American public memory.

Nike air defenses, and America's Cold War air defenses in general, rarely appear in historical narratives. Historians studying Cold War militarization like Michael Hogan, Michael Sherry, and Elaine Tyler May do not consider the tremendous deployment of military might embodied in America's Cold War air defenses.[6] Paul Boyer, Spencer Weart, Stephen Whitfield, Tom Engelhardt, Allan Winkler, and other historians examining Cold War thought and culture in the United States spend little time pondering the cultural implications of the dispersion of hundreds of military outposts into

[6] Michael J. Hogan, *A Cross of Iron: Harry S. Truman and the Origins of the National Security State, 1945-1954* (New York: Cambridge University Press, 2000); Michael S. Sherry, *In the Shadow of War: The United States Since the 1930s* (New Haven, Connecticut: Yale University Press, 1995); Elaine Tyler May, *Homeward Bound: American Families in the Cold War Era* (New York: Basic Books, 1988).

American communities.[7] Historians studying the Strategic Defense Initiative (SDI or Star Wars) like Frances Fitzgerald ignore the only nationwide defense against air-delivered nuclear weapons. Historians of civil defense such as Laura McEnaney decry the federal government's dependence upon local jurisdictions for civil defense while ignoring the massive national investment in an air defense network that included hundreds of air defense missile bases, radar stations, fighter-interceptor bases, and Ground Observer Corps sites.[8] Even military historians seldom consider these defenses, though amateur historians focusing on air defense have produced lesser-known works that consider some air defenses.[9] College history textbooks ignore air defense as well. Ironically, when these historians and textbooks do mention air defense, they focus upon the Safeguard anti-ballistic missile complex in Grand Forks, North Dakota and Reagan's Strategic Defense Initiative: the former ordered

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[7] Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age* (New York: Pantheon, 1985); Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1986); Stephen J. Whitfield, *The Culture of the Cold War* (Baltimore: Johns Hopkins University Press, 1991); Tom Engelhardt, *The End of Victory Culture: Cold War America and the Disillusioning of a Generation* (New York: Basic Books, 1995); Allan Winkler, *Life Under a Cloud: American Anxiety About the Atom* (New York: Oxford University Press, 1993).

[8] Frances Fitzgerald, *Way out There in the Blue: Reagan, Star Wars and the End of the Cold War* (New York: Simon & Schuster, 2000); Laura McEnaney, *Civil Defense Begins at Home: Militarization Meets Everyday Life in the Fifties* (Princeton: Princeton University Press, 2000).

[9] Perhaps the one exception is B. Bruce-Briggs' *The Shield of Faith* but it barely mentions the Ground Observer Corps. [B. Bruce-Briggs, *The Shield of Faith: A Chronicle of Strategic Defense from Zeppelins to Star Wars* (New York: Simon & Schuster, 1988) 64.]

closed the day after it opened and the latter never even built.[10] Somehow, while examining Eisenhower's warning against a military-industrial complex, historians have overlooked the largest peacetime dispersion of military might into the nation's communities.

Even compendiums of American military bases ignore America's Nike air defense missile installations and Cold War air defenses in general. Robert Roberts' *Encyclopedia of Historic Forts: The Military, Pioneer, and Trading Posts of the United States* goes as far as to list small trading posts and military forts of questionable existence while not listing Nike air defense missile bases. He does mention their existence in the preface of his massive tome. Their absence in the main body of this work proves that this historian did not feel Nike air defense missile bases were worthy of listings. Notes about posts with Nike air defenses, such as Fort Barry, California, do not mention the Cold War air defenses once present there, though they do list a number of coastal artillery batteries once onsite. A number of other cases exemplify how hard it must have been for Roberts to not delve in to America's Cold War air defenses. A passage on Fort Bliss, Texas, includes no mention of its role in Cold War air defense missile training and development, though a

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[10] James L. Roark, et. al., *The American Promise: A History of the United States,* compact ed. (Boston: Bedford/St. Martin's, 2000) 816, 836, 848; John Mack Faragher, et. al., *Out of Many: A History of the American People,* brief 3rd ed. (Upper Saddle River, New Jersey: Prentice Hall, 2001) 592, 594; Nelson Lichtenstein, et. al., *Who Built America? Working People and the Nation's Economy, Politics, Culture, and Society,* vol. 2, (Boston: Bedford/St. Martin's, 2000).

photograph of the base's signpost is dominated by a Nike Hercules missile and the sign reads "Fort Bliss: US Army Air Defense Center." An aerial oblique photograph of Sandy Hook Proving Ground (that includes Fort Hancock), New Jersey actually depicts Nike radomes in the background, yet the notes only indicate the post served as an, "…important radar and missile installation."[11] Roberts acknowledges that, while he delves into early seventeenth century fortifications built in what is now the United States by colonial powers such as the Swedish and Dutch, he does not list U.S. Air Force installations, and therefore cannot be expected to list Cold War Air Force radar stations. Still, his failure to even identify the presence of Dauphin Island Air Force Station (AFS), a Cold War radar station operational for fifteen years, is strange. An image of the base nearly dominates a picture of Fort Gaines, Alabama, immediately adjacent to the station, and indicates just how little merit America's Cold War air defenses possess in his compilation. Even details such as the presence of an anchor and chain, taken from Admiral Farragut's flagship and placed outside of the fort's entrance, are noted.[12]

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[11] Fort Brady, Florida, is a good example of the inclusion of forts with only the scarcest amount of information. The author's note on Fort Brady states, "The only notice found of this apparent Army post appeared on an 1839 Florida war map." [Robert B. Roberts, *Encyclopedia of Historic Forts: The Military, Pioneer, and Trading Posts of the United States* (New York: Macmillan Publishing Company, 1988) xii, 61, 151, 754, 517-518.]

[12] David F. Winkler, Searching the Skies: The Legacy of the United States Cold War Defense Radar Program (Langley Air Force Base, Virginia: U.S. Air Force, Headquarters Air Combat Command, 1997) 94; Robert B. Roberts, Encyclopedia of Historic Forts: The Military, Pioneer, and Trading

Figure 36

As tough as it is to ignore the Nike air defense missile system, historians have done so admirably. Robert Roberts' *Encyclopedia of Historic Forts* makes no mention of Fort Bliss' contributions to air defense, despite the Nike Hercules and HAWK missiles boldly depicted in the representative photograph of the base.
Courtesy of U.S. Army

Bud Hannings' *Forts of the United States: An Historical Dictionary, 16th Through 19th Centuries* is an even more extensive compilation that does not limit itself to Army installations or periods beyond the 19th century. Although it has individual listings for trading posts; Florida Seminole Indian War forts; Spanish missions and presidios; and even coastal artillery batteries; this encyclopedia does not list Nike air defense missile sites,

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Posts of the United States (New York: Macmillan Publishing Company, 1988) xi-xii, 5.

despite the fact that Nike sites often occupied or were located close by coastal artillery positions.[13] Clearly, Nike air defenses have slipped beneath the radar of America's historians. Considering what they have looked at reveals ways in which Nike air defenses stand apart from Cold War narratives.

Historical narratives of the Cold War thrive upon governmental secrets. Espionage, domestic surveillance, nuclear secrecy, covert military operations, secret missile bases, and defections are standard features in Cold War histories.[14] Nike air defense missile sites were decidedly not secret, both in terms of governmental classification and popular knowledge of their location and attributes.

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[13] Twentieth century military bases are listed in the last appendix. While Air Force bases used for Cold War air defense are listed (though not called out in their air defense capacity), neither radar stations nor air defense missile sites are listed in this appendix. The entry for Fort Hancock, New Jersey does mention that improvements after 1894 included Nike missiles, but that is as specific as Hannings gets. Eighteen coastal artillery batteries and two anti-motor torpedo boat batteries also located on Fort Hancock have their own listings. [Bud Hannings, *Forts of the United States: An Historical Dictionary, 16th Through 19th Centuries* (London: McFarland & Company, 2006) 278, 280.]

[14] While many Cold War histories focus solely on political and diplomatic events, Fred Inglis' *The Cruel Peace: Everyday Life and the Cold War* examines these subjects along with analysis of the impact of the Central Intelligence Agency, Federal Bureau of Investigation, nuclear nonproliferation, and espionage. More specialized histories that focus on Cold War secrecy include Hugh Wilford's *The Mighty Wurlitzer: How the CIA Played America* and Philip Taubman's *Secret Empire: Eisenhower, the CIA, and the Hidden Story of America's Space Espionage.*

Figure 37

The Nike air defense missile system does not fit into historical narratives of the Cold War that thrive upon governmental secrets. *Courtesy of Los Angeles Times*

A May 1954 Department of the Army memorandum indicates locations of Nike sites were not classified in and of themselves, but became classified when coupled with information such as serious radar masking, critical personnel shortages, effectiveness studies, and supply problems. Documents detailing locations of anything less than the entire defense areas of the contiguous United States were not classified, and even when detailing the locations of those nationwide defenses they were only required to be classified "confidential." Individual site locations were only classified as confidential during the real estate acquisition phase of Nike site construction until the site was tentatively selected for development, though the primary purpose of this rule was probably to prevent land speculation.[15]

This regulatory framework was reflected in public awareness of Nike sites. Information about Nike sites placed around cities appeared in countless ads, articles, school events, and even television programs. Convincing Americans of the necessity of nuclear missiles designed to explode over heavily populated areas brought about beauty pageants, parades with inert Nike missiles, community service by soldiers, and regularly

[15] John A. Klein, Acting Adjutant General, Department of the Army, "Memorandum to Commanding Generals, Continental Armies, Military District of Washington, Army Antiaircraft Command: Security Classification for AA Defenses," 20 May 1954, General Correspondence (Nike Sites) 1954, Box 1 of 3, Records of the 5th Region, Air Defense Command, Ft. Sheridan, Illinois, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Great Lakes Region (Chicago).

scheduled open house events on Nike bases. Since a decent distance existed between launch and integrated fire control sites, the Army permitted soldiers to park their own personally owned vehicles on Nike sites. These events and conditions make the Nike program difficult to fit into narratives that portray the Cold War as highly secretive.[16]

At least a portion of the blame for this confusion must be laid on the Army itself. Security and secrecy on Nike sites was paradoxical thanks to strong desires on the part of the Army for positive public relations and just concerns over espionage. Initially (as late as May 17, 1955) the speed and range of Ajax was classified. Yet almost immediately (1954 at least) newspapers and magazines began featuring large photos of the Ajax missile and site diagrams that depicted underground magazines, system components, and the basic way the system operated. By May of 1955 reporters and other guests were touring Nike sites and even riding the elevator down into the missile storage pit.[17] This paradox continued with the arrival of Hercules missiles. Nike personnel at SF-88 hosted the first public

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[16] See chapter two for additional evidence that Nike sites were far from secret. [U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 103, 318; "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, VI-13.]

[17] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 16-19, 21, 27.

display of the Hercules in the San Francisco Defense Area to the public on January 20, 1959. This ceremony was ironically held in the missile launch area of SF-88. Officials at the ceremony announced the public would be barred from this location in the future, after, of course, they had personally examined the new missiles and explored their launch area.[18]

Figure 38

Nike Hercules missile publicly unveiled in the launch area of SF-88. While hosting numerous guests at the ceremony, the Army announced that these people would not be permitted into the same area once the ceremony was over due to security concerns. Such actions reflected the Army's inconsistent security policies related to Nike sites.
Courtesy of NPS/Golden Gate NRA

[18] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 22, 24.

Nuclear weapons regulations added some secrecy, however absurd, to the process. Army officials openly acknowledged that Hercules missiles with nuclear warheads were deployed throughout the United States. Yet officials were prohibited from confirming or denying the presence of nuclear warheads on any particular Nike base, even after the sites were ordered deactivated and even as nuclear weapons were removed from the sites by helicopter.[19] To allay fears over nuclear weapons, a document from a conference of 6th ARADCOM Region commanders stipulated that the public continue to have access to Nike sites through regular open houses and special tours after the arrival of Hercules missiles. While the launch area remained generally off limits to tours, personnel could request special visits for certain groups, to include Operation Understanding alumni, who were supposed to provide positive publicity regarding Nike sites. Commanders were expected to encourage soldiers to request such visits when a clearly beneficial community relations end would be met. Official Army public affairs records reveal that these tours helped nearby communities accept the presence of these bases

[19] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 16, 19.

in their midst, regardless of whatever the Army would not mention was locked up in underground pits for the protection of the community.[20]

This mix of secrecy and openness helped generate peculiar rumors, such as Nike personnel never being able to tell civilians what they did for work. No mystery existed in that respect. The activities of soldiers were clearly visible to people passing by and visiting their base. Electric fences were never used on site. Electrocuting members of the public would not have fit ARADCOM's safe neighbor style public affairs campaign for the Nike. The government clearly told the public why the sites were there, and the presence of Hercules missiles did not end public tours of Nike sites. Somehow, these rumors persist. A single *New York Times* article somehow managed to perpetuate all of these rumors while noting that Nike soldiers made enough money to purchase houses in the local community and became "regular" community members; that Boy Scouts toured the sites; that soldiers got into trouble for engaging in romantic trysts with local girls around sites' supposedly electrified fences; and that nuns at a local girls school reprimanded soldiers on a Nike base for walking around the site in their underwear, since their school was close enough to make such activities

[20] "Operation Understanding" (an undated, typed document with no author), Commander's Conference, 26 May 1959, Ft. Baker, California, G3 Section, Organization Planning File, 1959, Commander's Conference Notes – II, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, California, Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 50.

plainly visible.[21] Indeed, the records of the 30th Antiaircraft Artillery Group headquartered at Fort Barry, California indicate tremendous public outreach efforts on behalf of the Army, and significant interest from the community. A report of public information activities for the month of February 1957 reveals that almost every day included a Nike site article, tour, or press release.[22]

American air defense units in general reflect a similar, if not as extensive, degree of openness and a desire to convince the American public that their services were needed and even desirable, while remaining purportedly secret. The center that controlled all North American Cold War air defenses, to include Nike defenses, is a case in point. An August 1962 picture in the *ARADCOM Argus* depicts Cheyenne Mountain, Colorado with a caption describing it as the future site of the underground North American Air Defense Command (NORAD) combat operations center. An additional diagram depicts the planned design of the underground NORAD Combat Operations Center.[23] The March 1966 issue of *ARADCOM Argus* even includes a photo depicting the inside of this Combat Operations Center *on the*

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[21] "From Amityville to Rocky Point, Missile Sites Held a Cold-War Secret," *New York Times,* 28 May 2000, L1.

[22] Kenneth Nicholson, "Memorandum to Commanding General, 6th Antiaircraft Regional Command, Fort Baker, California: Report of Public Information Activities," 8 March 1957, AG Central Files, 1957, Publicity, Box 2, Records of the 6th Region, Air Defense Command, Ft. Baker, CA. Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco).

[23] United States Army Air Defense Command, *ARADCOM Argus* (August 1962) 8.

cover of the magazine! A large, illuminated map and status sheet on the wall, no doubt nicknamed "the big board," was prominently displayed in this photo.[24] This information was not restricted to military periodicals. An April 1963 *New York Times* article also revealed a photo of the mountain and gave details about the size of caverns, the lengths of tunnels, water supplies, personnel capacities, and planned functions within the center.[25] A December 1962 *Los Angeles Times* article included a photo of the status board in the NORAD Combat Operations Center's former home in Colorado Springs.[26]

While visitation rights to this site were more restricted, that was far from the norm for Cold War air defense units. The 343d Fighter Group, a jet interceptor unit stationed at Duluth Air Force Base, Minnesota, hosted distinguished visitors or conducted formal tours for outside groups on 50% of all working days during the final quarter of 1964.[27] Tours began at the nearby SAGE building on December 1, 1958, before this massive, computer-driven Air Force command center even began running! Over twenty days more than nine hundred people visited the inside of this center.[28] Roughly two hundred

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[24] United States Army Air Defense Command, *ARADCOM Argus* (March 1966) cover.

[25] "Air Defense Center Builds Mountain Home," *New York Times,* 13 April 1963, 3.

[26] "At Defense Control Center Map Plots Bombers on Airborne Alert," *Los Angeles Times,* 13 December 1962, 3.

[27] "Historical Record of the Headquarters, 343d Fighter Group for the Period Ending 31 December 1964," Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 1-2.

[28] "Historical Record of the Duluth Air Defense Sector for the Period Ending 30 June 1958," 2.

miles away in Willmar, an open house on Armed Forces Day in 1960 attracted eight hundred people to a Cold War radar station where visitors explored the inside of radar towers and electronics buildings.[29] Unfortunately, openness was not the only characteristic Army and Air Force air defense unit shared that increased public knowledge of America's Cold War air defenses.

One reason a historical narratives of the Cold War ignore air defense accomplishments is due to fierce inter-service rivalries over Cold War air defense. The biggest proponents of air defense, the Army and Air Force, publicly questioned the value of each others existing and planned air defenses. In doing so, they not only reduced the significance of the sites in the minds of Americans, but also revealed key locational, operational, and performance data about the systems. Before any perceived missile gap existed between the Soviet Union and United States, the Army-Air Force air defense missile gap shaped the average American's experience with Cold War defense policy in the United States. In the same way Senator Joseph McCarthy's communist witch hunt discredited genuine incidents of communist infiltration, the Army-Air Force battle over air defenses discredited the legitimate value of air defense missile systems in the 1950s and 1960s, and further revealed the location and capabilities of America's air defense systems.

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[29] "Historical Record of the 721st Radar Squadron (SAGE) for the Period Ending 30 June 1960," Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 2.

Figure 39

Defense contractors joined in the Army-Air Force air defense missile rivalry. Large ads in major American newspapers not only promoted their products but also indicated service loyalties, revealed performance data and heralded the arrival of air defense missile bases. *Courtesy of New York Times*

The competition commenced before even the first Ajax site began defending the nation. In 1953 Secretary of Defense Charles Wilson cancelled a public firing of the Nike Ajax, citing security concerns, and blaming inter-service rivalries for what he considered to be security violations and leaks of military secrets that could seriously affect the nation.[30] In a 1954 press release, the Secretary of the Air Force questioned the Ajax's capabilities and claimed that successful tests employed World War II bombers whose speed count not match that of contemporary bombers.[31] By 1955 Nike units guarded four Air Force installations, and would extend their guard to other Strategic Air Command bases through the early 1960s, but this did not abate the feud.[32]

As the Air Force's BOMARC missile successfully passed development tests, the Air Force began waging a more concerted public relations campaign against the Army's air defenses. In a May 21, 1956 *New York Times* article, the Air Force questioned the Nike's ability to hit high-speed bombers. Similar articles appeared in papers across the United States for the next two years. The Army struck back with "Project Truth," a public relations campaign designed to educate the public about the Nike missile system,

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[30] "Wilson Order Cancels 'Nike' Demonstration," *Chicago Daily Tribune*, 9 April 1953, 3.

[31] "Air Secretary Offers Dismal Defense Hopes," *Chicago Daily Tribune*, 25 November 1954, D6.

[32] "Air Force Using Nike Though Doubting Value," *New York Times*, 26 November 1955, 4; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189.

which repeatedly criticized the Air Force's proposed BOMARC system. Congress took this bickering to heart when it began looking at ways to cut duplicate missile programs in 1959. Congress continued to fund both the Nike and BOMARC programs but proposed reducing the number of planned BOMARC sites.[33]

Figure 40

The most significant attacks against the Nike network came not from Soviet aircraft but from proponents of the BOMARC missile system. After a protracted development period during which the Air Force heavily criticized the Nike program, the government limited the BOMARC's deployment to eight sites.
Courtesy of U.S. Air Force

Their rationale was readily apparent. By 1959 the Nike Hercules was a nearly fully

[33] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 60, 62.

fielded, second generation weapon system, whereas the BOMARC was still struggling to get off the ground, literally. On September 1, 1959 the Air Defense Command declared the BOMARC squadron at McGuire Air Force Base, New Jersey operational, despite the fact that only one of the 46th Air Defense Squadron's sixty missiles was operational. By the end of the year only one more missile was listed as operational. The Air Force eventually constructed and operated eight BOMARC sites, two of which lay on Canadian soil and none of which lasted beyond 1972.[34]

An October 1957 memorandum demonstrates not only the pettiness of the Air Force-Army dispute over missiles but also the absurdity of some Cold War classification procedures. This Army document describes Air Force protests over the Army Antiaircraft Command (ARAACOM) changing its name to the U.S. Army Air Defense Command (USARADCOM). Apparently the Air Force sent a memorandum in 1957 to the Secretary of Defense objecting to this change of nomenclature, claiming that the Air Force, not the Army, was in charge of air defense. The rest of the memorandum identifies reasons the Army should proceed with this name change.[35] While the Army Antiaircraft Command had been using the term “antiaircraft” in its title, it had joined the Continental *Air Defense* Command (CONAD) in 1954 and joined the North

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[34] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 63.

[35] Lieutenant Colonel Andrew, Memorandum, "Army Air Defense Command," 26 October 1957, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

American *Air Defense* Command (NORAD) in 1957 (emphasis added). NORAD included Naval Forces CONAD and the Canadian Air Defense Command, yet the Air Force did not protest their incorporation into those air defense organizations. Even more surprising is the memorandum "confidential" classification, despite the fact that the most sensitive detail in this memo dealt with the Army being in charge of point defense. Newspapers publicized this decision of the Secretary of Defense nearly one year prior to that time, and such information remained far less sensitive than the photos of Nike missiles and sites that routinely appeared in newspapers.[36] Even public exhortations from the Secretary of Defense to end the feud went unheeded as the services began to resemble children bickering over expensive toys.[37]

Figure 41

"Neil H. McElroy, Secretary of Defense, disclosed today that he had issued orders for the Army and Air Force to halt their feud over whose anti-aircraft missile was better."

- Excerpt of a 1958 *New York Times* article highlighting the pettiness of the Army-Air Force air defense missile rivalry

The air defense rivalry became even more destructive as time went on. When the Air Force proposed replacing Nike sites around Chicago with BOMARC air defense missile sites, the Army countered by accusing the Air

[36] "Text of Wilson's Memorandum on Guided Missiles," *New York Times,* 27 November 1956, 22.

[37] "M'Elroy Asks End of a Missile Feud," *New York Times,* 11 September 1958, 7.

Force of planning for World War II. The Army's claim that the main threat to the United States by 1960 would be the Soviet ICBM was a calculated move to bolster support for the Army's prototype anti-ballistic missile: the Nike Zeus.[38] The battle between the Air Force and Army over air defense carried over into the development of anti-ballistic missiles.[39] The Army eventually cancelled the Zeus program, and Hercules sites continued to guard portions of the United States until 1979, but newspaper articles claiming that the Nike and BOMARC systems were obsolete date back to the inception of both missile systems thanks to this rivalry.

Winning the air defense publicity war against the Air Force did nothing to mask the presence of America's Nike defenses. One July 1, 1958, one day after the first Nike Hercules site was declared operational, the Army staged a gala welcome for the new system.[40] Five hundred government officials, military personnel, industrialists, and media representatives representing twelve nations converged on Fort Bliss, Texas and White Sands Missile Range, New Mexico. The Army promised the two-day exhibition of missile firings, helicopter exercises, and other attractions would "…make upcoming

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[38] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 9.

[39] "Air Force Scores McElroy Over Army's Missile Role," *New York Times,* 22 February 1958, 1.

[40] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 240.

Fourth of July fireworks seem small in comparison," according to an Army announcement. The events included the first live fire of a Nike Hercules missile for the public. While the warhead on this missile was conventional (non-nuclear), some members of the press felt the event was anything but conventional. They indicated that fourteen civilian engineering firms with Army missile contracts hosted and mostly paid for the affair, and noted that the event occurred during ongoing inter-service rivalries over air defense missions and budgets. "A question left unanswered amidst a six inch pile of twenty different information portfolios given each of 100 newsmen was whom the 'show' was staged primarily to impress. Conjectural targets included foreign nations, friendly or unfriendly, the other armed services, Federal budgeters and taxpayers."[41]

Surprisingly, the Army won the air defense missile battle. Cold War narratives typically characterize the Army as a low-tech force bogged down in the mountains of Korea and Vietnam alongside a high-tech Air Force of long-range bombers and intercontinental ballistic missiles. The Army was arguably the least adaptable branch of the Armed forces when it came to the centrality of nuclear weapons strategy in Eisenhower's "New Look". ARADCOM was one successful Army adaptation to the high-tech, nuclear armed forces that dominated defense appropriations in 1950s America.

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[41] "Army Shows Off Its Rocket Might" *New York Times,* 1 July 1958, 4.

The Army's success stemmed from several factors. The Army proved quite willing to deploy a less than perfect air defense missile system that could be upgraded. The rapid pace of technological development did make much air defense technology inferior to offensive missile technology in a relatively short period of time. Since the development of superior technology often occurred prior to the deployment of weapons systems utilizing existing technology in the 1950s, engineers often sought technology that could be improved once it was in place.[42] Following its installation of the Ajax, the Army upgraded to the Hercules, and then made numerous upgrades to that system. The Army also transferred control of air defense missile sites to the Army National Guard during a time of personnel shortages. This helped sell the program to political leaders concerned about defense spending and providing their constituents with jobs and appropriations.[43] Despite the Army's success in this inter-service battle, the mudslinging that occurred dramatically undermined support for nuclear air defense in the United States, and helped keep Nike sites anything but secret.

This is not to say that the Army permitted unrestricted access to Nike sites and information. In at least two cases, the federal government prosecuted Nike soldiers who passed classified information while spying for

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[42] Robert Wells and C.R. Whiting, *Early Warning: Electronic Guardians of Our Country* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962) 100-101.

[43] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 63.

the Soviet Union. In one of those cases, the level of atomic secrets included in the spy's confession was apparently so enormous that the Atomic Energy Commission recommended the prosecution drop all charges against the former soldier in an appeal hearing, resulting in the release of a man originally sentenced to life in prison.[44] In another instance, state police caught a Hungarian military officer and a fellow embassy official observing a Nike missile base near Orland Park in the Chicago Defense Area.[45] The following year, the same military officer and a new Hungarian embassy colleague raised hackles when they attended the Chicago International Trade Fair, where they allegedly took an intense interest the Nike Hercules and Ajax missiles on display. Of course, this was an *international* trade fair and these diplomats were permitted to travel freely in the United States. Additionally, the federal government had issued invitations to representatives of all foreign nations with embassies in the United States except for Czechoslovakia and the Soviet Union, who forbade American diplomats from traveling within their countries.[46]

These situations serve as telling examples of the Second Red Scare in the United States. While some spying did occur, it was all too easy for

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[44] "FBI Seizes Two As Soviet Spies for 11 Years," *Los Angeles Times,* 6 April 1965, 1; "Confession Too Hot So Ex-GI Convicted as Spy is Set Free," *Los Angeles Times,* 9 March 1966, 1.

[45] "Catch 2 Reds Who Spied on Missile Base," *Chicago Daily Tribune,* 1 December 1960, 1.

[46] "Reds View Trade Fair Missiles," *Chicago Daily Tribune,* 28 July 1961, 7.

representatives of communist countries to legitimately obtain detailed Nike information and plans. Furthermore, American citizens did not unequivocally support all anticommunist efforts, opposing even the protection provided by Nike sites for less than idealistic reasons.

Another thread evident in most historical narratives of the Cold War is the Second Red Scare. Typical Cold War histories depict American citizens as helpless spectators watching Soviet and American leaders repeatedly threaten to destroy each other's nation. Contrary to these narratives, Americans in the 1950s were not petrified of opposing anti-communism, even when it came to national defense. Opposition to Nike air defense missile sites proves that Americans were not mindlessly performing duck and cover drills during the Cold War but that they possessed the agency and nerve to legally oppose the federal government as it tried to defend the nation with air defense missile sites. Homeowners, politicians, civic groups, and governmental bodies, not anti-nuclear protestors or radical students that characterized protests during the 1960s, initiated this opposition.

Figure 42

"Any contractor may now obtain data on 'NIKE' locations and construction blueprints by paying a fee of as low as $50 at any place where bids are advertised. There is no preliminary screening for security, officials said…Pentagon officials blame the Armed Services Procurement Act of 1948 for the laxity."

- Excerpt of a 1954 San Francisco Examiner article, published well before the construction of most Ajax sites

While generally supportive of air defense, Americans often opposed placement of air defense missile sites in the vicinity of their property or community. An official history of the Ajax system written in 1959 characterized the situation bluntly. "Objections came in every form from official complaint by civic officials to absurd criticism by cranks. Real estate groups, farmers, and homeowners all contributed to this show-down in the national air defense effort." Objections stemmed from public ignorance of Nike operations, high-handed attitudes of land acquisition and site construction officials, and official regulations that prohibited full disclosure of the Army's intentions. In some cases, local landowners refused to give real estate acquisition officials permission to examine their property. Eventually the government permitted a minimal amount of information to be shared with landowners and local officials.[47] In this manner the American public routinely knew about Nike sites before the ground was even broken on these bases. Homeowners and local officials often used the press as a vehicle to rally support for or opposition to the placement of these sites in their communities.

Members of the public objected to Nike site placement in nearly all of the areas designated for such sites, and sought recourse at virtually every level of government. In the most prominent case, the Mayor of Los Angeles publicly protested the planned placement of a Nike Ajax site on the grounds

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[47] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 190-191.

of Los Angeles International Airport, requesting the assistance of California's Senators as well as the Secretaries of the Army, Navy, Air Force, and Commerce. Military officials reconsidered the wisdom of placing an air defense base so close to such a high volume of air traffic and selected a different site for an Ajax base.[48] Around Chicago, numerous citizen groups repeatedly complained to the park district board that the Army's $1 per year lease of lakefront parklands was an inappropriate use of much-needed and highly valuable public space. These protests occurred before the Nike sites were built, while they were being upgraded, and after they were decommissioned: a span of nearly two decades from the mid 1950s through the early 1970s.[49] Other towns and cities, concerned about not only safety issues but also the loss of property tax revenues, joined in the opposition using different methods.[50] When the contractor hired by the Army Corps of Engineers did not submit building plans for the Nike Hercules missile

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[48] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 191-192.

[49] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 42; "Radar Center Underway at 55th St., Lake: Community Group Hits Army Site," *Chicago Tribune*, 13 January 1955, S1; "Residents Hit Enlargement of Nike Site: Slate Meeting to Protest," *Chicago Tribune*, 25 June 1961, S1; "Indian Vows Defense of Nike Site Village," *Chicago Tribune*, 20 June 1971, 14.

[50] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 15.

installation being constructed in Porter, Indiana, the town board ordered the contractor to cease building this base on a lot zoned for residential use. Town officials, angry over never being notified by the Army that the land had been condemned and irate over the loss of taxable land, ordered all work to cease. The contractor complied.[51] Although the town board called the Army's construction of a Nike missile base in Porter an "unauthorized invasion of the town," Porter officials shortly ceased opposition to the site, allegedly in response to a general call from the Eisenhower administration to bolster the nation's defenses. While the board understood the land had been seized using powers of eminent domain, it requested Army representatives demonstrate how they were allowed to violate local laws like the building code and zoning ordinance after this seizure. No proof ever came.[52]

In general, public opposition to Nike sites seems directly correlated to a loss of private land more than the presence or absence of nuclear missiles, since the public appears to have raised at least as much opposition to Ajax sites as they did to Hercules sites. If the reactions of property owners in Middletown, New Jersey, are representative, a minority of the residents owning land upon which the Nike Ajax site was placed fought the Army's seizure of the land. The Middletown Ajax site required 76.44 acres. The Army only purchased 22.71 of these acres for its sole use. The Navy's Earle

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[51] "Nike Project at Porter is Halted," *The Vidette-Messenger* (Indiana), 10 October 1956, 1.

[52] "Porter Gives Up on Its Nike Fight," *The Vidette-Messenger* (Indiana), 14 November 1956, 1.

Ammunition Depot granted the Army a use permit over 14.40 acres of its property. The Army also purchased 14 easements totaling 39.33 acres. These easements permitted property owners to maintain their land subject to certain use limitations in return for financial compensation.[53] Nevertheless, people objected to the Middletown Nike site. Of the five private property owners from whom the Army requested land, two legally challenged this taking. Nearly half of the individuals from whom the government requested land for the Middletown Nike site had the courage to openly oppose the federal government at the end of the Second Red Scare. Undoubtedly others were unhappy with the taking but did not go so far as to sue the Army.

The details of one of these cases illustrate the lengths to which some went to oppose the placement of these sites. On January 21, 1956, the Army requested 4.55 acres of Michael and Mary Stavola's land simply for an easement to ensure nothing masked Nike site NY-53's radar. The Stavolas were allowed to build and maintain structures and vegetation up to sixty-five feet high on this land, yet they still fought this action by suing the Army! Since this 4.55 acres contained significant road frontage, they claimed that it was the most valuable portion of their land. They went on to claim that this was

[53] Department of the Army, Office of the New York District Engineer, North Atlantic Division, "Final Project Map: Real Estate, New York Defense Area, Nike Battery NY-53, 17 June 1958," NY Defense Area, Monmouth County, NJ, D-NJ-486, GSA Real Property Disposal Case Files, Region 2 (New York/New Jersey), General Records of the General Services Administration, Record Group 269, National Archives and Records Administration - Northeast Region (New York City).

essentially a taking of the entire property, since they alleged the rights left to them would have made the property worthless. Michael Stavola also stated that the Nike site was a hazard that would have made his property difficult to sell.[54]

Michael and Mary Stavola won a revestment. Their land was excluded from the taking, but not until March 24, 1961. The Stavolas may have won on philosophical terms, but from a fiscal perspective, the Army clearly won. The Stavolas agreed to waive compensation for the taking while the government used the site during the period of litigation, meaning the government used their land rent free from 1956 to 1961.[55] Shortly after the explosion of Ajax missiles at NY-53 in May 1958, the Army determined the site would not receive Hercules missiles. The only question was when the Middletown Nike site would close. Nike site NY-53 closed in April 1963.[56]

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[54] Pre-Trial Order C-859-55, United States of America, Plaintiff, v. 21.66 Acres, Township of Middletown, Tract No. A107-E, Michael Stavola, Owner, Defendant, 20 December 1960, U.S. District Court, District of New Jersey, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Northeast Region (New York City) 2-3.

[55] Civil No. 89-55, Judgment on Stipulation for Revestment of Tract No. A-107-E Under 40 U.S.C. 258f, United States of America, Plaintiff, v. 21.66 Acres (Now Amended to 66.59 Acres) of Land, more or less, situate in Township of Middletown, County of Monmouth, State of New Jersey; and John West, et als, Defendants Michael Stavola and Mary Stavola, 24 March 1961, U.S. District Court, District of New Jersey, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Northeast Region (New York City).

[56] "Guardsmen Soon to Take Over the Nike Base of Battery 'B,'" *Red Bank Register*, 7 August 1958, 2; Mark Morgan and Mark Berhow, *Rings of*

The Stavola's neighbor, Lowell Bellingham, initially took a more aggressive stance. Bellingham charged the United States government with trespassing on the lands the government intended to take as well as damaging his other land. He filed suit against the government on the same day Michael Stavola issued his lawsuit.[57] Bellingham, however, backed down, and fared somewhat better from a financial standpoint. Initially, the government recommended Bellingham receive $4900 for his land which totaled roughly five acres. In the end the government bought Bellingham's land for $15,400. Whether Bellingham won his case or whether the government negotiated to his satisfaction is unclear.[58]

Citizens who agreed to easements sometimes challenged the government simply for more money. When the Army bought an easement on Andrew Rafacz's farm land in Cook County, Illinois, it stated vegetation had to

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Supersonic Steel: The Air Defenses of the United States Army 1950-1979 (San Pedro, California: Fort MacArthur Military Press, 2002) 122.

[57] Civil Action No. 859-55, Answer and Counterclaim, United States of America v. 21.66 Acres (Now Amended to 66.59 Acres) of Land, more or less, situate in Township of Middletown, County of Monmouth, State of New Jersey; and John West, et als., 3 August 1956, U.S. District Court, District of New Jersey, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Northeast Region (New York City).

[58] Civil Action No. 859-55, Stipulation, Tract Nos. A-105, A-105-B-1, A-105-B-2, A-105-B-3, A-105-B-4, A-105-B-5, United States of America v. 21.66 Acres (Now Amended to 66.59 Acres) of Land, more or less, situate in Township of Middletown, County of Monmouth, State of New Jersey; and John West, et als., U.S. District Court, District of New Jersey, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Northeast Region (New York City).

be cut down to the ground. This farmer sued for loss of crop revenues and won several thousand dollars in U.S. District Court.[59]

Opposition to governmental use of private land, much less seizure of that land, is nothing new. Historians agree the royal requirement that colonial subjects quarter British troops helped raise colonial indignation enough to spark the American Revolution. Still, such vehement opposition to air defense missile sites during a period of fear over nuclear weapons and Soviet intentions counters early Cold War stereotypes. Americans were not cowed by the specter of militaristic communism and remained unafraid of opposing governmental acts for fear of being labeled a communist.

The point is that there was some opposition, not universal opposition. Many Americans supported the air defense Nike sites brought to their communities. While Americans in general may have not wanted missile sites in their back yard, they also did not like the idea of their city going undefended. When officials in St. Louis learned in 1956 that their city was one of the most probable targets for air attack, Congressman Frank Karsten asked Army officials to place St. Louis on the priority list to receive Nike

[59] United States of America, Plaintiff, vs. 117.7449 Acres of Land more or less, situate in the County of Cook, State of Illinois; and Andrew Rafacz, et al., Case No. 55C603, U.S. District Court, Northern District of Illinois, Eastern Division, Chicago, Civil Records, Civil Case Files, 1938-1969, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Great Lakes Region (Chicago).

missile air defense sites.[60] Some communities took pride in their newfound association with the military. The *Los Angeles Times* noted a minor squabble between local communities in West Orange County over who owned the nearby Nike site. Stanton, Buena Park, Westminster, and Garden Grove all touted the site as theirs.[61]

Figure 43

"I am sure you are all aware of the delays that can ensue if public relations are not properly handled, the problems with the man of property who does not want a Nike site in his area, the man who will not permit a tree to be removed that interferes with the line of sight, the bird watcher who resents the presence of the man with the blueprint, the municipality that will not give up a portion of a highly prized park."

- excerpt of an Army Corps of Engineers briefing

More than simply the willingness to oppose these sites, Americans in general did have a degree of agency in determining the placement of Cold War air defenses, as the Army's response to public opposition indicates. The Army began its land acquisition very expeditiously. When landowners refused to sell their property in fee or easement to the Army, the federal government announced it would seize the land, giving defendants only twenty days to respond to condemnation legally via a court document prepared by an attorney. The

[60] Christine Whitacre, ed., *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 46.

[61] "Stanton Blasts Neighbors Who Claim Nike Site," *Los Angeles Times,* 29 August 1954, H7.

government did, however, let defendants present evidence to help determine the amount of compensation for land.[62] Unsurprisingly, not all Americans were thrilled with these procedures, and they made their concerns known. Surprisingly, high-ranking defense officials listened and made substantive changes. In a strong reaction to Army actions taken to acquire W-44/46, a Nike site in the Washington-Baltimore Defense Area, the Assistant Secretary of Defense changed the initial method used to acquire Nike sites. He instructed real estate acquisition officials to carefully consider real estate costs, public relations, and construction delays when acquiring Nike sites. He directed the Undersecretary of the Army to ensure Nike site layout minimized the amount of needed land and to avoid creating uneconomic or inaccessible portions of land for private property owners. He noted this was being done in many cases, but needed to be pursued more aggressively and earlier in the process.[63] At Nike site NY-53 in Middletown, New Jersey Army officials agreed to adjust the base location, move buildings, and shift base entrances

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[62] Wilber M. Brucker, Secretary of the Army, Declaration of Taking, Civil No. 859-55, United States of America v. 21.66 Acres (Now Amended to 66.59 Acres) of Land, more or less, situate in Township of Middletown, County of Monmouth, State of New Jersey; and John West, et als, 13 June 1956, U.S. District Court, District of New Jersey, Records of the District Courts of the United States, Record Group 21, National Archives and Records Administration - Northeast Region (New York City).

[63] Franklin G. Floete, Assistant Secretary of Defense, Memorandum for the Under Secretary of the Army, "Clearance for Real Estate Actions - Nike W-44(6) Washington-Baltimore Defense Area," 24 March 1954, in "Construction Changes in CWE," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 1.

and exits prior to the site's construction.[64] Despite such actions, the American public remained dissatisfied by Nike takings in general. Nevertheless, public opposition usually died once missile bases were in place.[65]

Beyond secrecy and the Second Red Scare, the space and missile race is a nearly universal theme in historical accounts of the Cold War, yet the Nike defies this aspect of traditional narratives too. Soviet successes in space exploration and intercontinental ballistic missile developments not only scooped headlines from America's Nike program, they continue to dominate historical narratives and public memory of the Cold War.

Apart from the American moon landing in 1969, few space exploration events have received more attention than the initial Soviet accomplishments. On October 4, 1957, the Soviet Union launched Sputnik I, the world's first satellite. On May 15, 1958, the Soviets launched Sputnik II, a space vehicle weighing 1,120 pounds that carried the first living being (a dog named Laika) into outer space. The Soviet Union captured these first space exploration accomplishments largely thanks to technology proven by their ICBM program, which launched the first intercontinental ballistic missile in the summer of 1957. The Soviets accomplished this feat by developing massive rockets

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[64] "They Told Us It Never Could Happen," *Asbury Park Evening Press*, 23 May 1958, 1.

[65] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 193.

designed to heft heavy payloads.[66] During this same time, American scientists focused not upon building bigger missiles, but upon reducing the size of nuclear technology so that it could be transported by smaller missiles already in the American arsenal. By focusing on reducing the size of nuclear technology, American scientists were able to create the world's first deployed, nuclear, guided, surface-to-air missile: the Nike Hercules.[67] Technological advances since then have proven the advantage of smaller, lighter nuclear weapons such as the development of multiple independently targetable reentry vehicles (MIRVs) for intercontinental ballistic missiles in the 1970s.[68] The Hercules is one of the earliest tangible results of this American focus and, although it was very successful, the launch of the first ICBM and Sputniks I and II are seen as defining moments of the Cold War. NASA also used Nike missiles to develop numerous sounding rockets and sounding rocket delivery systems, to include the Nike Cajun, Nike Hawk, Nike Hydac, Nike Iroquois, Nike Recruit, and even the Nike Nike.[69] These small research rockets enabled the United States to conduct extensive weather and space studies, but none of these advancements eclipsed early, headline-grabbing

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[66] Wernher von Braun and Frederick I. Ordway III, *History of Rocketry & Space Travel*, 3d revised ed. (New York: Thomas Y. Crowell Company, 1975) 166-167.

[67] "New Atom Missiles Will Guard 4 Areas in Nation this June," *New York Times*, 29 January 1958, 1.

[68] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 130.

[69] Wade, Mark, ed. "Nike." *Encyclopedia Astronautica*. [http://www.astronautix.com/lvs/nike.htm], accessed 31 August 2008.

Soviet space successes. The general public has forgotten the development of the Hercules, but remembers images of monkeys and dogs in space suits drafted for service as cosmonaut guinea pigs.

Formal preservation designations overwhelmingly prove this point. The most exalted and best-protected category of historic properties in the United States is the National Historic Landmark. A National Historic Landmark theme study on the space race, completed in 1984 by the National Park Service, identified twenty-five National Historic Landmarks and one additional nationally significant property listed in the National Register of Historic Places that best represent the space race.[70] By comparison, only one National Historic Landmark can be even loosely associated with the Nike system: Fort Hancock, New Jersey. This former military base, significant for its longstanding defenses dating from the Revolutionary War to the Cold War, included a Nike missile double battery, but that Nike site is hardly the lynchpin of Fort Hancock's significance.[71]

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[70] Harry A. Butowsky, *Man in Space: Study of Alternatives* (Washington: National Park Service, 1987) [http://www.nps.gov/history/history/online_books/butowsky3/space0.htm], accessed 9 February 2008.

[71] White Sands (Missile Range) V-2 Launching Site is a National Historic Landmark whose boundaries and significance are limited to the areas used to test V-2 missiles, not Nike missiles. [Harry Butowsky, National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District, 1982, 1; National Historic Landmarks Program, "White Sands V-2 Launching Site" [http://tps.cr.nps.gov/nhl/detail2.cfm?ResourceId=1939&Date=2006&Ownership=PublicFederal&priorityname=Satisfactory&ResourceType=Site], accessed 10 February 2008.]

But a focus on the space race does not explain how American public memory seems to minimize the massive military buildup engendered by air defense. In the case of Nike air defenses, these high-tech forces do not fit into narratives of soldiers in Korea fighting off waves of Chinese infantrymen and troops in Vietnam beset by guerillas. In his book *The End of Victory Culture: Cold War America and the Disillusioning of a Generation* Tom Engelhardt describes the United States Army as "demilitarized" between 1953 and 1963, replaced by a technologically heavy Air Force.[72] While the Army was far from demilitarized, the 1950s were undoubtedly a heyday for the Air Force. This upstart branch of the armed forces suddenly leapt ahead of its older brethren, the Army and Navy, in terms of funding.[73] In 1953, the final year of the Korean War, the Army possessed a greater budget than the Air Force. Within two years the Air Force budget doubled that of the Army and within four years the Air Force's $18.4 billion budget was just $1 billion less than the budget of all of the other armed forces combined. Eisenhower's New Look policy relied upon on technology more than troops. Over the course of the 1950s America's nuclear arsenal grew from several hundred to over

[72] Tom Engelhardt, *The End of Victory Culture: Cold War America and the Disillusioning of a Generation* (New York: Basic Books, 1995) 79.

[73] David F. Winkler, *Training to Fight: Training and Education During the Cold War* (Washington, DC: United States Legacy Program Cold War Task Force, 1997) 45, 49.

18,000 nuclear weapons.[74] Yet many of these nuclear weapons were Hercules missiles. New Look remains synonymous with “massive retaliation” in American public memory and history and, while offensive nuclear forces did make up a considerable portion of Eisenhower’s defense outlay, air defenses against nuclear weapons are a consistently overlooked aspect of 1950s defense policy.

The Army’s role as a high-tech air defense force refutes traditional historical narratives of Army troops during the 1950s and 1960s: infantrymen fighting in savage, close-quarters combat in the mountains of Korea and Vietnam. In a 1974 retrospective piece on Chicago’s Nike missile sites, NBC television correspondent Peter Knollen described the addition of Nike sites in the 1950s as "…adding a Buck Rogers effect to the landscape around the nation's big industrial cities."[75] While Nike personnel made up a relatively small portion of the Army’s total troop strength, their presence on hundreds of bases through the United States made them much more apparent. Bringing missiles and personnel in and out on helicopters highlighted their presence

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[74] David F. Winkler, *Training to Fight: Training and Education During the Cold War* (Washington, DC: United States Legacy Program Cold War Task Force, 1997) 49-51, 59.

[75] "TV News Item, Chicago Channel 5 NBC - T.V. (Peter Knollen - Correspondent), Aired Friday 15 February 1974, on Local Evening News (1700 Hours)" [no date], in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. II (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 14.

Figure 44

Two images from ARADCOM's official publication demonstrate how Nike air defense missile system soldiers (above) did not fit the traditional Army look or combat environment (below).
Courtesy of U.S. Army

even more. Additionally, 48% of the Army's 1958 construction budget went toward Nike missile site construction, demonstrating the technological focus of defense spending during the 1950s, even in the Army.[76]

Eugene Rabinowitz, editor of the *Bulletin of Atomic Scientists*, also identified the technological watershed in America's armed forces during the 1950s and the way this contradicted traditional ideas about military service. Writing in 1956 he noted that American citizens still associated the term "war" with a clash between massive armies, as depicted in the two World Wars.[77] America's fear of standing armies never really rose in response to America's massive Cold War air defense apparatus because these air defenses did not fit the traditional mold of American military forces.[78] Air defense personnel were not recruited for heroism far away but for tedious watchfulness right at home, often in places where few military units had been stationed previously. No patriotic send offs accompanied these people. No ticker tape parades greeted them when they came home, and no regret over the lack of such

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[76] While 1958 was a year during which tremendous Nike site construction occurred, it was by no means the only year of such development. Nike site construction dated back to the early 1950s and the last Hercules site did not open until April 1965. [Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 9; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 44-179.]

[77] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1986) 252.

[78] This partially explains why numerous scholars like Michael Sherry and Michael Hogan have not labeled the 1950s as especially militarized.

sendoffs or parades ever plagued the American consciousness. Personnel manning these sites were chosen for their technical expertise more than their bravery, strength, or leadership skills. Machines and routinization took over warfare. Even national emergencies and dangerous international events which shocked civilian populations and caused other military units to go on alert status affected air defense units, since they already maintained a very high level of readiness.[79] A 1962 layman's guide to air defense includes a chapter titled "The Giants" which lionizes the men who must anticipate changes, engineer solutions, and maintain the complex technology American air defenses relied upon.[80] Historical narratives and public memory have yet to lionize these soldiers.

Figure 45

"'They also serve,' the poet John Milton wrote, 'who only stand and wait.' During wartime, it becomes Milton's most quoted line. But no man ever waited as long for action as the coastal defenses of the San Francisco Bay area."

- Opening to a 1986 *San Francisco Chronicle* retrospective on San Francisco's Nike defenses

In his study of human perceptions and interpretations of warfare, *Changing Images of the Warrior Hero in America: A History of Popular Symbolism*, Edward Linenthal notes that facts are less relevant than stories and heroes when composing products of public memory such as the movies, paintings, and

[79] "30th Air Division (SAGE), 30th CONAD/NORAD Region and the Cuban Crisis, October 22-November 27, 1962," Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, 34, 49, 58, 67.

[80] Robert Wells and C.R. Whiting, *Early Warning: Electronic Guardians of Our Country* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1962) 100.

songs that describe a war. Linenthal notes Americans portray their wars as mythical, creative events that bring forth life from chaos. Warriors are depicted as courageous saviors who sacrifice themselves to give new life to the nation. Contemporary conflicts are assigned to mythical categories.[81] Air defense techno-warriors who pushed buttons and whose military leaders bickered over whether they could fulfill the traditional warrior mission of protection and salvation do not fit the regenerative warrior archetype in the United States. The utter poisoning of a nation that was a likely result of nuclear war had only negative, terrible correlations in history such as the atomic blast at Hiroshima. Unsurprisingly, America's nuclear air defenses go unremembered for the most part by the American public.

This high-tech model for the American military hero of the 1950s stands apart from the Korean War and Vietnam quite distinctly. In both of these conflicts, the United States proved unwilling to use nuclear weapons, yet in between these wars nuclear weapons became the cornerstone of American defense strategy. Following the Korean armistice, the Army began using short-range, tactical nuclear missiles and artillery capable of being employed by ground forces. Highly mobile "Pentomic" divisions, made up of five battle groups deployed in five-sided formations to engage enemies from any direction, treated nuclear weapons as simply more powerful forms of

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[81] Edward Linenthal, *Changing Images of the Warrior Hero in America: A History of Popular Symbolism* (New York: The Edwin Mellen Press, 1982) viii-ix.

conventional artillery, anticipating their use in eliminating large concentrations of troops and equipment.[82] Even civilian technicians manned nuclear weapons on Nike air defense installations.

These ideas were completely abandoned in Vietnam and have never been used since. It is no wonder they have been forgotten. The 1950s, the heyday of nuclear military technology and strategy, is an anomaly in Cold War history. The subsequent decade, where America became embroiled in Vietnam, made all of America's armed forces seem impotent. The Army's superior conventional firepower could not defeat a guerilla force in Vietnam. America's massive nuclear capabilities proved politically unacceptable and went unused there as well. The Air Force's bombing abilities, so effective during World War II, proved appallingly ineffective during Vietnam, despite the fact that the United States dropped more explosives on Vietnam than it used during World War II. America's National Guard forces, crucial partners in America's Nike air defenses, were for the most part held out of Vietnam in an effort to reduce the apparent involvement of America in that conflict.[83]

The focus on technology across the armed forces in the 1950s was so great that Eisenhower, the president who presided over much of this technological shift, left office warning Americans about the dangers of a

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[82] David F. Winkler, *Training to Fight: Training and Education During the Cold War* (Washington, DC: United States Legacy Program Cold War Task Force, 1997) 46-47.

[83] David F. Winkler, *Training to Fight: Training and Education During the Cold War* (Washington, DC: United States Legacy Program Cold War Task Force, 1997) 73.

military-industrial complex. His sentiment was shared by ex-SS missile scientist Wernher von Braun, who worried of the growing power of private defense contractors and their ability to lure his team of naturalized Nazis from governmental research into private industry.[84] The power and prestige of firms like Douglas and Western Electric, both key players in the development and production of Nike missiles, is readily apparent when reading contemporary periodicals. Full-page ads in major American newspapers recruiting engineers and detailing air defense developments highlight the work of engineering firms in supplying key elements of America's air defenses.[85]

Other evidence demonstrates that Americans considered high-tech Nike bases separate from traditional military sites. This study found no correlation between public memory or historic preservation of Nike sites and earlier military activities on those same sites. SF-88, located on what was once Fort Barry, had an extremely long history of military activities on site. Fort Barry lies within Marin County, California which had numerous military bases over time including three Army forts, an Army camp, an Air Force base, an Air Force radar station, a Corps of Engineers headquarters, two military

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[84] "Visit With a Prophet of the Space Age" *New York Times,* 20 October 1957, SM14.

[85] "Douglas Aircraft Invites Engineers and Designers to Local Interviews Monday February 13th: Expanding Opportunities - Good Security - Ideal Living Conditions," *New York Times,* 12 February 1956, E7; "How Good Is Perfect? Army's Hercules Missile Scores Perfect Against Speeding Jets," *New York Times,* 20 October 1958, 33.

academies, and various smaller areas controlled by the Navy, Marines, and Coast Guard. Instead of being forgotten amidst the clutter of a longtime military presence of one form or another, SF-88 is the best restored and most visited Nike site in the United States.[86]

One could argue that Nike sites located in areas with a long-time military presence would stand a better chance of being remembered thanks to the area's long connection to military preparedness, but again, Nike sites defy that characterization. On the Atlantic coast, military forces began using Fort Hancock before the nation began, and an Air Force station complete with a Nike Missile Master sprang up next to the fort during the Cold War years as well. Despite this longstanding military presence and the presence of a double Nike Hercules site on Fort Hancock itself, neither military personnel nor National Park Service staff prevented the rapid deterioration of Guardian Park, the most significant memorial to Nike personnel in the nation, though that park has recently been restored by volunteers interested in the Nike site. In communities with no longstanding military presence, Nike sites could stand out as unique or get lost amidst more domestic preservation and memory concerns, but neither classification fits. Conversations with various people in the historical community in Valparaiso, Indiana and exhibits at the local historical society did not reveal an identification with any one particular period in military history or the regular presence of military forces in the area.

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[86] William M. Vanderbilt, "The Military in Marin," *Marin County* (California) *Historical Society Magazine* (Fall 1996) 20.

Despite this fact, area residents felt nearby C-47 worthy of not only preservation but also a place in the National Register of Historic Places, though they have done little to preserve the site. Conversely, no citizens have made efforts to preserve any of the four Nike air defense missile sites that surrounded Minneapolis and St. Paul, Minnesota, despite the fact that Nike sites in Roberts, Wisconsin, Farmington, Minnesota, Bethel, Minnesota, and St. Bonifacius, Minnesota represent those communities' sole military base. As if to provide even less of any sort of correlation, St. Bonifacius has erected an inert Nike Hercules missile and a small plaque at its base in a community park, and the Historic American Engineering Record has documented the Farmington Nike site, though none of these four sites are listed in the National Register of Historic Places.

By the late 1960s, when Vietnam and a personnel heavy, low-tech force dominated the Army, few protesters associated Nike air defense missile sites with the American military enough to protest the Vietnam War at them. High-tech Air Force bombers in Vietnam proved unable to bring victory technologically or ideologically. Air defenses back in the United States were equally as impotent when it came to stopping intercontinental ballistic missiles and convincing Americans of their worth. Indeed, the Cold War service of President George W. Bush as a fighter-interceptor pilot was repeatedly characterized throughout the 2004 presidential election campaign as something hardly comparable in significance to the service of American

infantrymen like John Kerry in the Vietnam War, yet most would agree that protecting America from nuclear holocaust is at least as important as waging a counter-insurgency overseas.[87]

Regardless of the relative value of Nike sites, it is clear that historical narratives of the Cold War have ignored Nike bases and American air defenses in general, primarily due to difficulties integrating Nike defenses into studies that rely upon secrecy; the Second Red Scare; the space and missile race; and a low-tech Army. Yet the near dearth of public memory and preservation of Nike defenses cannot be attributed solely to the power of deterrence or the power of historical narratives. Fortunately, Americans do not associate Nike sites with fearful or traumatic memories, but fear and trauma related to other Cold War events has left deep imprints in American public memory. This has minimized public memory of the Nike air defense missile system.

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[87] "Bush's Duty, and Privilege," *New York Times*, 13 February 2004, A.31; "Three Decades Later, Vietnam Remains a Hot Issue," *New York Times.* 29 August 2004, 1.26; "Vietnam, the War that Won't Heal," *The Village Voice* (New York), 18-24 August 2004, 34.

6 Fear, Trauma, and Public Memory of the Nike Air Defense Missile System

Perhaps the most puzzling aspect of the limited public memory of Nike air defense missile sites is why they are not remembered because of the fear generated by nuclear weapons in American society. Americans clearly knew about the effects of nuclear weapons on people when Nike bases received nuclear Hercules missiles in the late 1950s. In 1946 *The New Yorker* devoted an entire issue to nothing but fear-inspiring, traumatic accounts of the effects of the atomic bomb in Hiroshima.

> When Mr. Tanimoto…reached the park, it was very crowded, and to distinguish the living from the dead was not easy, for most of the people lay still, with their eyes open…Mr. Tanimoto found about twenty men and women on the sandspit…They did not move and he realized they were too weak to lift themselves. He reached down and took a woman by the hands, but her skin slipped off in huge, glovelike pieces…he remembered uneasily what the great burns he had seen during the day had been like: yellow at first, then red and swollen, with the skin sloughed off, and finally, in the evening, suppurated and smelly…He had to keep consciously repeating to himself, "These are human beings…" By nightfall ten thousand victims of the explosion had invaded the Red Cross hospital…Ceilings had fallen; plaster, dust, blood and vomit were everywhere. Patients were dying by the hundreds but there was nobody to carry away the corpses.[1]

[1] So powerful was this edition of *The New Yorker* that it was reprinted several times by different publishers in book form. [John Hersey, *Hiroshima* (New York: Random House, 1989) 36, 45-47.]

Hercules missiles could be equipped with several different nuclear warheads, with the mid-range warhead possessing roughly the same power as the bomb dropped on Hiroshima. Typical Nike Hercules missile sites contained three magazines with eight Hercules missiles each.[2] Of course, the American public did not always know whether nuclear warheads were on the missiles at Nike sites in their community. Army security procedures required soldiers to state that they could not confirm or deny the presence of nuclear weapons on Nike sites, though newspapers and other mass media made clear long before the first Hercules site was built that Hercules missiles included nuclear warheads.[3] Even more terrifying, Americans did not know the power of these particular warheads, but they did know popular media increasingly described the yields of nuclear weapons in megatons, not kilotons. One author, the aptly named H. Jack Geiger, tried to put one megaton, or one million tons of TNT, in terms more comprehensible to the average individual. He described such a bomb as the equivalent of eighty

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[2] James Gibson, *The History of the U.S. Nuclear Arsenal* (Greenwich, Connecticut: Brompton Books Corp., 1989) 172-174; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 182.

[3] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command*, Vol. I, II, VI (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 16; "Defense Aides Back Nike, Call New One Phenomenal," *New York Times,* 29 May 1956, 1; "Army Developing New Atom Missile," *New York Times,* 24 December 1956, 24.

Hiroshima sized bombs or a freight train three hundred miles long filled with TNT, which would take six hours to pass if it were going fifty miles per hour.[4]

While there was trauma associated with some Nike operations, it paled in comparison to trauma generated by deaths from a variety of more mundane causes, and generated far less fear than the threat of attack using intercontinental ballistic missiles. Additionally, the trauma and fear generated by other twentieth century conflicts, notably World War II and Vietnam, eclipses the trauma and fear associated with Nike air defenses. The absence of significant trauma and fear associated with the Nike system partially explains the very low profile America's Nike air defense missile network maintains in American public memory.

Perhaps the best indicator of the low level of trauma and fear produced by Nike sites was the muted response to the worst Nike accident and first missile disaster in American history.[5] In May 1958 an explosion at the Middletown, New Jersey Nike base killed six enlisted men and four civilian ordinance personnel employed by the Department of the Army. Two more men were injured.[6] So severe was the blast that four of the deceased

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[4] H. Jack. Geiger, "Medical Consequences of Nuclear War," in *Security vs. Survival: The Nuclear Arms Race*, eds. Theresa C. Smith and Indu B. Singh (Boulder, Colorado: Lynne Rienner Publishers, Inc., 1985) 140-141.

[5] "Army Experts at Nike Site: Middletown Disaster Killing 10 First in History of U.S. Missiles," *Newark Evening News*, 23 May 1958.

[6] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 58.

personnel had to be buried in a common grave.[7] One warhead was found three miles from the blast site and people fifteen miles away felt the explosion. In addition to eight missiles and associated launcher equipment destroyed, two military trucks and one civilian vehicle in the launcher area were also damaged beyond repair. An Army Board of Officers determined the most probable cause of the explosion was the rupture of a detonation cap during authorized missile modifications.[8] A follow up inspection by ARADCOM at the end of August revealed many other accidents waiting to happen: 605 improperly installed caps and 309 damaged caps out of 5,971 nationwide.[9]

The accident could have been far worse. No one outside of the base was even wounded, much less killed. Shrapnel from the missiles that exploded in a three-mile radius did not ignite munitions at Earl Naval Ammunition Depot, on whose land part of NY-53's integrated fire control site sat. The accident could have involved nuclear Hercules missiles, rather than Ajax missiles armed with conventional explosives. Just across New York

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[7] "In One Grave," newspaper article, unknown newspaper, unknown date, in "May 22, 1958 Explosion of Nikes, Middletown," vertical file, Fort Hancock Museum Archives, Sandy Hook, Gateway National Recreation Area.

[8] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 55, 58.

[9] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 380.

Figure 46

Wreckage from the May 22, 1958 missile explosion at NY-53 in Middletown, New Jersey included a personally owned vehicle (top left). Soldiers routinely drove their automobiles onto and off of Nike air defense missile sites, further normalizing the presence of these missile bases.
Courtesy of U.S. Army

Harbor, the Nike missile site at Fort Tilden, New York, was in the process of being converted to a nuclear-capable Hercules missile base, the second in the nation to receive this upgrade.[10] And those were not the only nuclear

[10] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 240.

missiles in the area. On June 7, 1960, just over two years after the Middletown accident, a helium vessel in a nuclear BOMARC missile on nearby McGuire Air Force Base ruptured and caused an explosion and fire which ignited the missile and nuclear warhead. While the loss of roughly one to one and one-half kilograms of plutonium, probably washed away in the firefighting effort, was undoubtedly hazardous, the most damage was arguably sustained by the military's public relations effort. During the initial confusion after the start of the fire an Air Force sergeant informed the New Jersey State Police that a nuclear warhead had exploded, causing the local wire service to report that heavy does of radiation were being sent throughout the local area. Several hours afterward Air Force officials announced there was no radiation danger to the local area, but by that time the damage had been done.[11]

The Army's response to the Middletown explosion was far better than the Air Force's initial reaction to the BOMARC disaster. ARADCOM sent representatives to appear on the Today show the morning after the accident, when the explosion had only occurred in the early afternoon of the previous day.[12] Rather than rushing to blame site personnel for the explosion,

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[11] John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 377-378.

[12] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 8.

ARADCOM's General Charles Duff praised the soldiers on site who quickly lowered unexploded missiles below ground after the immediate blast, clearly thinking not of their own safety but of the safety of the surrounding community.[13] Representatives of both the Army and Bell Telephone Labs agreed to appear at a public meeting in Middletown to answer questions. Both assured the public that future modifications to missiles would occur with only one missile above ground at a time, unlike the many missiles above ground when this explosion took place.[14] Understanding that economics generated resistance to Nike sites even more than fear of explosions, the Army was on-site within forty-eight hours paying damage claims that totaled over $11,000 by the end of June. The Army even paid claims as small as $3 for a broken window.[15] Middletown Mayor Frank Blaisdell followed suit, announcing that tax reassessments would consider the location of the property in relation to this Nike missile facility when determining land values.[16] Several months after the accident, the Army established the Committee on Safeguards for Army Air Defense Weapons. Enlisting five captains of industry and research to independently oversee Hercules nuclear

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[13] "Residents Take Blast in Stride," *Red Bank Register* (New Jersey), 27 May 1958.

[14] "Sympathy, Not Protest Marks Public Meeting on Nike Blast," *Courier* (Middletown Township, New Jersey), 29 May 1958, 1.

[15] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 199.

[16] "Sympathy, Not Protest Marks Public Meeting on Nike Blast," *Courier* (Middletown Township, New Jersey), 29 May 1958, 1.

warhead safety, the Army received accolades from the Senate subcommittee investigating the Middletown explosion.[17]

This rapid, reassuring Army response paid off. Communities around the United States took the Middletown accident in stride. A meeting with the Chapel Hill Civic Association (representing seventy-five families that lived close by the Nike base) four nights after the explosion revealed that the public continued to support the Army's air defense mission at NY-53.[18] One

Figure 47

"Let's forget the hysteria and have confidence in the U.S. Army and its competent officers. Now we should express our sympathy to those who suffered the loss, and be glad we have the protection the base gives us."

- Mary Sullivan addressing a meeting of area residents several days after a fatal Ajax missile explosion at Nike site NY-53 in Middletown, New Jersey

Middletown resident stated that he believed more fatal accidents would occur on Highway 35 in Middletown than on the Nike base, and requested people who really wanted a safer community start there before worrying about the Nike site.[19] A Cleveland newspaper editorial stated that Americans

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[17] "Steps Taken Against Mishaps Like One at N.J. Nike Base," *Trenton Times,* 5 October 1958.

[18] "Residents Take Blast in Stride," *Red Bank Register* (New Jersey), 27 May 1958.

[19] James J. Maloney, Letter to Middletown (New Jersey) Township Committee, 23 May 1958, in "Missile Sites" Folder, Box 3, Air Defense Command Photo Collection, 1934-1970, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

acknowledged their communities were vulnerable to a no-notice nuclear attack and that defense required these missiles be armed and ready to fire rapidly. An editorial in the *Indianapolis Star* noted that the fact that no one outside of the base was hurt by the explosion in some ways validated the Army's selection process for these sites, which had been a compromise between defensive value and local land use.[20] Even in small towns around Nike air defense missile sites the response was surprisingly subdued. The *Vidette-Messenger* of Valparaiso, Indiana, a newspaper from a town roughly seven miles from the Wheeler Nike site and roughly thirteen miles from another Nike site in Porter, Indiana, described the 1958 blast at the Middletown, New Jersey Nike site in a single article the day after the blast and never mentioned the presence of similar bases in the area. The newspaper printed no follow up articles or editorials regarding the subject for at least one week after the incident.[21]

While local, national, and international newspapers reported the initial explosion, the accident failed to generate the longer-term concern, evidenced in related news stories, that so many tragedies do.[22] Normally, tragedies are quickly followed by a fascination with similar accidents and a collective

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[20] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 64.

[21] "Seek Cause of Missile Blast," *The Vidette-Messenger* (Indiana), 23 May 1958, 1.

[22] “Middletown Story Front Page News in European Newspapers,” *Asbury Park Evening Press,* 24 May 1958.

discussion regarding how to prevent similar accidents. The December 26, 2004 Indian Ocean tsunami inspired tremendous analysis of the historical incidence of tsunamis and the state of tsunami warning systems.[23] The Interstate 35 bridge collapse that occurred during rush hour on August 1, 2007, in Minneapolis generated national outrage and a nationwide bridge analysis.[24] The terrorist attacks on September 11, 2001 continue to fuel governmental investigations, military operations, political posturing, memorialization, and media investigations.[25] The Nike explosion at Middletown did not even generate concern with similar bases at the community level, at least not enough to make many local and regional newspapers, despite the existence of similar sites in the majority of American states.

In addition to the Army's rapid, reassuring response to the disaster, much of the subdued public response must also be attributed to the relatively small degree of trauma and damage associated with this explosion, compared to other forms of accidental death and damage. While the death of ten personnel in this explosion was undoubtedly significant, no serious

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[23] National Public Radio, *Morning Edition*, 26 December 2005.

[24] "$188 Billion Needed to Fix 70,000 Bridges; Three Hundred Million Vehicles a Day Pass Over the 'Structurally Deficient' Spans," *Wisconsin State Journal,* 3 August 2007, A7.

[25] "'A Day of Renewing Resolve'; President, First Lady Pay Tribute at Ground Zero, While Americans Look Toward Today's Solemn Anniversary," *Times Union* (Albany, New York), 11 September 2006, A1.

personal injuries occurred off-site as a result of the blast.[26] By contrast, eleven thousand five hundred people died from fires in the United States in 1958. Damage caused by these fires totaled $1,305,000,000.[27] But Nike bases were not really comparable to homes in American communities, where most fire deaths typically occur. Prior to the explosion, Army officials compared Nike bases to gas stations when trying to explain the hazards of sites to members of the public. Both of these hazards possessed a low chance of accident but high potential for damage and were spaced at regular intervals throughout American society.[28] Both types of sites become more valuable, and more likely to become targets, during war. Like Nike sites, gas stations did occasionally experience accidents. The day before the Middletown Nike site accident, one dozen massive gasoline and oil tanks exploded at a refinery in Long Beach, California, not far from the Nike air defense missile site at Fort MacArthur. The blast killed two, caused nine

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[26] Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 199-200.

[27] "Fires Killed 11,500 in US During 1958," *New York Times,* 16 January 1959, 16.

[28] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 27.

million dollars in damage, and sent one tank's circular lid sailing four hundred feet through the air like a Frisbee.[29]

To be sure, fairly mundane civilian and military technology caused greater harm than any missile technology employed on Nike sites. The biggest safety problem experienced by the 6th ARADCOM Region that guarded much of the western United States consisted of vehicle accidents by troops off duty and away from their installation. The problem was so great throughout the nation that ARADCOM gave out prizes to soldiers who merely maintained a clean driving record each quarter.[30] Air defense missiles were also far less dangerous than military aircraft. From November 1954 to November 1956 the Air Force experienced 3,600 aircraft accidents. A full forty-five percent of these crashes occurred off of military bases. The death toll from these accidents makes the incident at Middletown look minor. In addition to 1,125 pilots killed, 61 civilians died, 47 of whom were killed by crashing jets, many of which were air defense jets which worked with air defense missile sites to defend the nation.[31] In fact, prior to the BOMARC

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[29] "2 Die in Coast Oil Fire," *New York Times,* 23 May 1958, 24; "Fires Killed 11,500 in US During 1958," *New York Times,* 16 January 1959, 16.

[30] "Brochure Contents" (an untitled, typed document with no author), 23 June 1960, G3 Section, Organization Planning File, 1959, Briefings, Box 3, Records of the 6th Region, Air Defense Command, Ft. Baker, CA., Records of the United States Army Commands (1942 to Present), Record Group 338, National Archives and Records Administration - Pacific Region (San Francisco) 16.

[31] "Air Force Trying to Cut Accidents, General Says: Flight Safety Director Asks Public to Understand Need for Jet Training," *Los Angeles Times,* 8 November 1956, B3.

accident at McGuire Air Force Base in 1960, all six accidents involving nuclear weapons in the United States involved nuclear weapons aboard aircraft, five of them due to plane crashes.[32] Aircraft safety problems became so acute that the nation's highest official got personally involved on the very same day as the Middletown explosion. Responding to an alarming fifty-nine deaths from military-civilian plane collisions over the previous month, President Dwight Eisenhower ordered five emergency rules into immediate effect to prevent such accidents.[33]

Figure 48

"Radar 'Death Ray' Cooks Technician"

Los Angeles, Calif.--(AP)-- A California physician reported in a medical journal radar beams can be fatal to humans and one fatality occurred at a radar manufacturing plant here in 1954...The case was not reported until now for security reasons, the doctor said..."

- Excerpt of an Associated Press article appearing in the *Minneapolis Morning Tribune*. June 1. 1957.

Other technology may not have been directly attributable to many deaths, but still generated much suspicion and fear. Every Nike installation maintained several radar transmitters. Beginning in the 1950s, experts and laymen alike questioned whether the level of microwave radiation emitted from radar stations was safe. The fact that the Soviet military standard for safe radiation

[32] BOMARC Fire is Ninth Accident in Nuclear Bomb or Warhead," *New York Times,* 8 June 1960, 2.

[33] "…Rules to Halt Airway Collisions Fast," *Daily News*, 23 May 1958.

exposure was 1/1000th of the American level concerned Americans even more.[34]

Make no mistake, Nike sites contained significant hazards, even before nuclear missiles arrived in the late 1950s. On September 30, 1955, a massive explosion during a Hercules test occurred at White Sands Proving Ground, killing one contractor, injuring five more, and damaging the test building beyond repair. While there had been earlier explosions during Nike Ajax and Hercules tests, none had been this powerful, and none had killed anyone. In subsequent accidents portions of Nike missiles caught on fire, exploded, were accidentally fired, and flew off course and crashed, killing and injuring lesser numbers of people; destroying homes; damaging factories; and wrecking testing facilities.[35] Perhaps the most hazardous work on Nike Ajax sites consisted of refueling the missile with highly volatile chemicals designed

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[34] "'Benign' Radiation Increasingly Cited as Dangerous," *New York Times,* 21 October 1980, C1.

[35] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972) 58; "' GI's Error Sets off Nike; Missile lands Near Highway," *Chicago Daily Tribune,* 15 April 1955, 9; "Nike Rocket Kills GI and Injures 5," *Chicago Daily Tribune,* 20 June 1959, 9; "Nike Goes Astray, Explodes Beside House in Texas," *Chicago Daily Tribune,* 21 February 1959, 2; "Rocket Motor Plant Explosions Injure 10," *Chicago Daily Tribune,* 31 March 1962, 9; "Nike Blows Up 500 FT. in Air; 1 Dead, 3 Hurt," *Chicago Daily Tribune,* 5 December 1962, 8; "Nike Fired By Accident, No One Hurt," *Los Angeles Times,* 9 March 1963, 18; "Big Missile Explodes Over Hawaii Town," *San Francisco Examiner*, 10 June 1966, "Rocket/Military, U.S. Army, Nike-Hercules," Clippings Files, San Francisco History Center Morgue, San Francisco Public Library, San Francisco, California; "Nike Facility Set Afire by Missile," *Los Angeles Times,* 7 March 1967, 3; "Nike Missile Explodes in Oahu Test Firing," *Chicago Tribune,* 11 May 1967, C11.

Figure 49

Crewmen fueling or “slugging” an Ajax missile in an early version of the protective suit. Protective suits indicated one of the hazards of life on Nike sites and lent a futuristic, outer space aesthetic not typically associated with the Army of the 1950s-1970s.
Courtesy of U.S. Army

to explode on contact. The Army developed special suits to protect Ajax crewmen from these chemicals. One version consisted of resin-modified butyl rubber over a cotton base designed to create an impermeable barrier. Oxygen tanks provided air to the wearer of the outfit and helped give it all the

style of an early deep-sea diving suit.[36] Such precautions seem extreme, considering the Army's claim that Nike sites were as safe as gasoline stations, but accounts of veterans indicate that the dangers of each fuel component far exceeded the hazards of gasoline. Unsymmetrical dimethyl hydrazine (UDMH) fumes caused permanent damage to lung tissue. Red fuming nitric acid burned through skin and bones. JP-4 contained carcinogens designed to kill bacteria foolish enough to make a home inside an explosive missile. Additionally, these hypergolic components exploded on contact, so personnel had to separately fill each component's tank in a highly controlled environment.[37]

Even the lift equipment used on Nike sites possessed the potential to cause severe harm. A noncommissioned officer assigned to A Battery, 1-60 Artillery was crushed under a missile being lowered into the pits at the Wheeler, Indiana Nike site in December 1960. Still, while Nike missiles were inherently dangerous, accidents in the line of duty were not frequent. The death at Wheeler was only the second death that had occurred in the line of duty in the entire 45th Artillery Brigade since its activation on July 28, 1952.[38] The defensive nuclear and non-nuclear missiles and equipment on Nike sites simply produced less trauma and fear than other forms of technology. They

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[36] United States Army Air Defense Command, *ARADCOM Argus* (August 1958) 2.

[37] John Porter, Nike Site SF-88 (Oral) Guided Tour, 7 October 2005.

[38] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, VI-5.

also produced less fear than the threat of nuclear war using offensive intercontinental ballistic missiles.

Indeed, the success of the Nike program does contribute to its lack of prominence in American public memory. Numerous editorials and letters to the editor from citizens across the United States during the 1950s explain how people felt the risk of having Nike air defense missile sites in or near particular communities was a better alternative than having no defense against Soviet aircraft dropping nuclear bombs.[39] The fixation with such a terrible possibility continues to dominate American public memory and scholarship. In his book *Symbolic Defense: The Cultural Significance of the Strategic Defense Initiative*, Edward Linenthal identifies three periods of cultural anxiety over nuclear weapons and nuclear war in American society. The power of the atomic blasts at Hiroshima and Nagasaki generated the first, from 1945 to 1950. The third was a great awakening of nuclear concern in the late 1970s that helped generate support for and against the Strategic Defense Initiative. Both of these periods occurred before and after the Nike system guarded the nation. Linenthal postulates that the second period, from 1954-1963, had nothing to do with the presence of thousands of defensive nuclear missiles in hundreds of communities throughout the United States. He believes the cultural anxiety of the period stemmed from publicity over

[39] U.S. Department of the Army Policy and Programs Division Office of the Chief of Information, *Middletown Nike: A Case Study in Army Public Relations* (31 December 1958) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 4, 11, 64-65.

nuclear fallout from testing, the Berlin crisis of 1958, and the Cuban Missile Crisis. Indeed the possibility of nuclear destruction from attacking Soviet forces was such an overwhelming idea that Linenthal did not even mention the Nike air defense missile system anywhere in his book.[40]

Clearly, offensive nuclear weapons generated tremendous concern in American society. The threat they posed was so serious that Americans considered weapons that shed fallout and debris over their cities to be positive defensive measures. Yet this has not made defensive nuclear weapons like the Nike system memorable. Their inability to defend the nation against intercontinental ballistic missiles made the Nike system an afterthought when Americans tried to cope with a nuclear arms race devoid of substantive defenses. Nuclear weapons became both the enemy and protector of humanity.

In his book *Nuclear Fear: A History of Images* historian Spencer Weart documents how Americans increasingly felt helpless in the face of potential nuclear war after 1945. The atomic bomb helped America win World War II, but as the Soviets gained the bomb and an arms race ensued, nuclear weapons seemed to become more of a problem. The weapons could not be used to help win wars in Korea and Vietnam, for their use might have provoked a massive retaliation from the Soviets. Full-scale nuclear war

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[40] Edward T. Linenthal, *Symbolic Defense: The Cultural Significance of the Strategic Defense Initiative* (Urbana: University of Illinois Press, 1989) 113.

brought dire predictions of the dangers of widespread fallout by scientists, filmmakers, and authors alike, yet the United States continued to produce nuclear weapons.[41]

Popular film and literature that dealt with nuclear war exploded during the period when Hercules sites were being installed, evidence of the serious concern over nuclear weapons radiating throughout the United States. Paul Brians' *Nuclear Holocausts: Atomic War in Fiction, 1895 - 1984* identifies 169 nuclear war novels and short stories written between 1957 and 1964 alone.[42] Mainstream media promulgated these fictional accounts as well. The most enduring of those sources fed this fear by either making nuclear air defenses appear powerless to stop nuclear war or making them complicit in the start of such a war.

On the Beach by Nevil Shute is a compelling tale about the extinction of human life on the planet following a nuclear war. Written in 1957, adapted for film in 1959, and set in 1964, the film depicts a poisoned world, with deadly nuclear fallout slowly drifting southward toward one last island of humanity: Australia. As the nuclear cloud drifts closer, a scientist, submarine captain, and socialite, played by Fred Astaire, Gregory Peck, and Ava Gardner, prepare for imminent death. Astaire's character, scientist Julian Osborne, makes no distinction between offensive and defensive nuclear

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[41] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 258-262.

[42] Kenneth D. Rose, *One Nation Underground: A History of the Fallout Shelter* (New York: New York University Press, 2001) 40.

weapons. “The war started when people accepted the idiotic principle that peace could be maintained by arranging to defend themselves with weapons they couldn't possibly use without committing suicide.”[43]

Written in 1959 *Alas, Babylon* describes a fictional nuclear war in which American offensive and defensive nuclear forces deliver a resounding victory in a war against the Soviet Union, yet the effects of the war render much of the United States uninhabitable. As residents of a small Florida town try to piece together what happened, they struggle not only to survive but also to retain their humanity amidst a chaotic world.[44]

Fail Safe, a 1962 novel by Eugene Burdick and Harvey Wheeler, tried to convince readers that America’ highly computerized air defense system contained flaws that might lead to accidental nuclear war.[45] In the book, a false alert of a nuclear attack sends American bombers streaking toward Moscow. When recall procedures fail and one bomber manages to evade all Soviet air defenses and drop a nuclear bomb on Moscow, the President of the United States takes dramatic action to prevent a full-scale nuclear war. Perhaps the most disturbing portion of Burdick and Wheeler’s text lay in their short preface, where they insisted the technology and systems that existed made this scenario a very real possibility.

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[43] *On the Beach,* directed by Stanley Kramer, Metro Goldwyn Mayer, 1959.

[44] Pat Frank, *Alas, Babylon* (Philadelphia: Lippincott, 1959).

[45] Eugene Burdick and Harvey Wheeler, *Fail Safe* (New York: Dell, 1962).

> For there is substantial agreement among experts that an accidental war is possible and that its probability increases with the increasing complexity of the man-machine components which make up our defense system. Hardly a week passes without some new warning of this danger by knowledgeable persons who take seriously their duty to warn and inform the people. In addition, all too often past crises have been revealed to us in which the world tottered on the brink of thermonuclear war while SAC commanders pondered the true nature of unidentified flying objects on their radar screen.

Military personnel, politicians, and anti-nuclear activists did not help quell the fear. Inter-service rivalries decreased public confidence in America's air defenses, especially when Air Force officials publicly questioned the reliability of the Army's many Nike air defense missile bases around the nation.[46] Not only did the Army and Air Force develop their own air defense missile systems, they developed separate command organizations designed to provide air defense across the nation. Neither organization could rebut the charges made by politicians that the United States remained vulnerable to a drastic "bomber gap" in 1955 and then a "missile gap" in 1957. Although based upon fear and partisan political maneuvering for the presidency rather than actual Soviet capabilities, the allegations helped convince the American public that air defense was essentially useless. Anti-nuclear activists helped generate positive action toward nuclear disarmament by pushing for the Limited Test Ban Treaty of 1963. This agreement banned testing of nuclear weapons under water, in the atmosphere, and in outer space by Great Britain,

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[46] "Air Force Calls Army Nike Unfit to Guard Nation: Questions Whether Missile Can Down Guided Bombs or High-Altitude Planes," *New York Times,* 21 May 1956, 1.

the United States and the Soviet Union. When these countries began conducting atomic bomb tests underground, the fledgling nuclear disarmament movement that focused public concern upon airborne fallout failed to identify practical goals a majority of people would advocate. Increasingly, these groups became dominated by radical youth who aligned anti-nuclear activism with less popular issues, thereby fragmenting anti-nuclear support.[47]

Yet as the issues became more complex, public discourse decreased. Spencer Weart notes that debate over nuclear strategy dropped off completely, peaking after the Cuban Missile Crisis but existing at just one quarter of that size by the end of the 1960s.[48] Paul Boyer cites similar trends in his classic analysis of Cold War thought and culture *By the Bomb's Early Light*. Public opinion polls taken in 1964 noted the number of Americans who believed nuclear war was the most pressing problem in the nation was just 16%, a massive decrease from the 64% who believed that just five years earlier.[49] Why did this change occur? The complexity of the nuclear issue brought about cognitive dissonance and psychic numbing for Americans in general.

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[47] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 262.

[48] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 262.

[49] Paul Boyer, By the Bomb's Early Light: American Thought and Culture at the *Dawn of the Atomic Age* (New York: Pantheon, 1985) 355-356.

Weart believes Americans began employing cognitive dissonance on a large scale during the late 1950s and early 1960s to cope with fear of nuclear war. Cognitive dissonance arises when beliefs conflict with behavior and individuals attempt to ignore this contradiction. When forced to notice the contradiction, people try to bring their beliefs into consonance either by modifying their beliefs or by taking certain actions. While many Americans felt the chances of nuclear war in the 1950s and 1960s were high, few took the necessary steps to protect themselves. Those who confronted this cognitive dissonance modified their behaviors or beliefs. Behavioral changes included building bomb shelters, moving to an area less likely to be affected by nuclear war, advocating the abolition of nuclear weapons, and lobbying for air defense. Evidence shows few Americans changed their behavior. Far more appear to have changed their beliefs. Belief changes included thinking that nuclear weapons would only be used as deterrents, deciding the chances of nuclear war were very low anyway, and believing nothing could survive nuclear war within or outside of any type of shelter.[50]

Such belief changes were necessary to maintain normalcy in everyday life. Psychologist Robert Lifton noted something similar. He believed people were able to go about their normal lives despite the threat of nuclear holocaust thanks to "psychic numbing:" a combination of classical psychoanalytic defense mechanisms such as denial, repression, and

[50] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 263-266.

suppression. By excluding feelings of fear associated with painful images, Americans used psychic numbing to create a "numbing of everyday life." This enabled them to cope with the horrible potential inherent in nuclear weapons while routinely going about their everyday lives.[51] Studies conducted in the first half of the Cold War showed there was little correlation between education (even about nuclear war) and the level of anxiety experienced by Americans due to the threat of nuclear war. The one direct correlation that existed indicated that people who worried more about things in general tended to worry more about nuclear war. Nuclear weapons had become an inextricable part of life in America, essentially. There seemed to be no choice about having them, no defense against them, nor any sane strategy to use them. Americans had to choose between living life normally or fearing nuclear war so much that life came crashing to a halt.[52]

This is perhaps the most interesting aspect of Cold War America. Security through the presence of nuclear weapons became a normal, though certainly hazardous, aspect of life in the United States. In much the same way, Americans during the Cold War relied heavily upon automobiles for transportation, despite the fact that thirty-seven thousand Americans died from motor vehicle accidents in 1958, the year the United States experienced

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[51] Robert Jay Lifton and Richard Falk, *Indefensible Weapons: The Political and Psychological Case Against Nuclearism* (New York: Basic Books, 1982) 103-105.

[52] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 263-266.

its worst Nike disaster ever in which ten people died.[53] Every age has its technologically-driven, or better yet, "man-made" hazards. Like automobiles, nuclear weapons became just another regular, albeit hazardous, aspect of life in Cold War America. This is one aspect of history that makes it so fascinating. The things we take for granted in the present may become horrifying oddities to future generations. Lifton noted how even language numbed Americans to the fear associated with nuclear weapons. Terms like "nuclear exchange" and names like "Little Boy" gave no indication of incinerating corpses and the invisible, poisonous, spreading fallout that come with nuclear war.[54]

The experiences of military personnel in other conflicts validate the premises of Weart and Lifton. In his study of human perceptions and interpretations of warfare, *Changing Images of the Warrior Hero in America: A History of Popular Symbolism*, Edward Linenthal describes how atomic weapons and total war made war a part of daily existence. They also made every place a potential battlefield and transformed all Americans into warriors, if not to fight, then simply to be legitimate targets and die. Warriors become numb to an extent after being at war, from either killing or having someone try

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[53] National Safety Council, *Accident Facts* (1959) 7.

[54] Robert Jay Lifton and Richard Falk, *Indefensible Weapons: The Political and Psychological Case Against Nuclearism* (New York: Basic Books, 1982) 106-107.

to kill them repeatedly.[55] Being placed in the psychological position of a warrior helps explain how the American population could acquire a very similar form of psychic numbing. Naturally, the American population knew they were perhaps only minutes away from war, knew they were targets, and knew that portions of their military were targeting other civilians, but, like the warrior in battle, they had to go on living, regardless of the stress.

Post World War II modern architecture in America may reflect this cognitive dissonance. In his article "Archaeological Examination of Cold War Architecture: A Reactionary Cultural Response to the Threat of Nuclear War" William Johnson characterizes post-war suburbs as "the antithesis of the brutish, survival-minded lessons taught by civil effects testing." He believes Americans purposefully embraced thin-walled, open architecture that frequently utilized massive windows to neutralize their fears of nuclear holocaust.[56] Then again this architecture may simply represent an American design awash in psychic numbness. Regardless of what such design choices represent, modern architecture clearly rails against the civil defense

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[55] Edward Linenthal, *Changing Images of the Warrior Hero in America: A History of Popular Symbolism* (New York: The Edwin Mellen Press, 1982) 132, 135, 139.

[56] Johnson refers to nuclear tests conducted to assess the survivability of residential and commercial structures as "civil effects testing." [William Gray Johnson, "Archaeological Examination of Cold War Architecture: A Reactionary Cultural Response to the Threat of Nuclear War," in *Materiel Culture: The Archaeology of Twentieth Century Conflict,* eds. John Schofield, William Gray Johnson, and Colleen M. Beck (London: Routledge Press, 2002), 228, 233-234.]

standards of the 1950s and early 1960s that sought safety in windowless bunkers far underground.

Even experts succumbed to this cognitive dissonance and psychic numbness. Many civilian and military leaders did not build shelters, advocate new defensive measures, or call for disarmament. In the five years leading up to 1960, writers filled the U.S. Army journal *Military Review* with articles about the tactical use of nuclear weapons. Half as many articles appeared in the following *twenty* years.[57] Of course, intercontinental ballistic missile technology had something to do with that. Ground observers could not spot intercontinental ballistic missiles in time to do anything. Conventional radar stations could not detect ICBMs. Special radar stations built to detect missiles entering earth's atmosphere did not need nuclear missiles to be destroyed: conventional explosives worked just fine. Fighter interceptor jets could not catch and destroy these weapons. Air defense missiles could not hit intercontinental ballistic missiles and also shed dangerous radiation over the cities they were supposed to protect. In addition to fallout and a devastating blast, these air defense missiles, like all nuclear weapons, could emit a dangerous electromagnetic pulse that had the potential to knock out electrical circuits across the United States. America's air defenses could not

[57] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 267.

protect the nation from large numbers of nuclear missiles. Deterrence was all the United States had, and the public had no serious role in that.

If the American public felt confused by the dilemma, pollsters did as well. The Gallup Poll, underwritten by newspapers across the nation, regularly queries representative samples of Americans to gauge public opinion. Examining the issues the Gallup Poll covers reveals that fewer polls were conducted about air defense against nuclear weapons than nearly all other nuclear issues. Interestingly, the six polls related to air defense against nuclear weapons conducted between 1946 and 1991 are clustered in two distinct groups: 1949-1951 and 1977-1983. The infrequency of polls might suggest that pollsters believed public opinion rarely had a chance of affecting nuclear defense policy. But the complete absence of polls during all but two periods when the United States possessed no substantive air defenses suggests that America's foremost public opinion poll had difficulties formulating feasible air defense options.[58]

Like the American public, pollsters appear to have disassociated Cold War air defense components. Polls related to Star Wars, formally known as the Strategic Defense Initiative, appear in a completely separate category of surveys conducted solely in 1985 and 1986. Star Wars proved to be such a compelling concept that pollsters completely disassociated it from previous queries on air defense against nuclear weapons. Separate headings for

[58] Alec M. Gallup, *The Gallup Poll Cumulative Index: Public Opinion, 1935-1997* (Wilmington, Delaware: Scholarly Resources, Incorporated, 1999).

these two topics appear in the poll index. Neither heading includes polls that also fall under the other topic, though "nuclear defense system," does list "Star Wars" as a cross reference. Interestingly, Gallup conducted more polls about Star Wars than nuclear air defense in general (seven versus six), but neither topic attracted as much attention as a wide variety of other subjects directly related to the nuclear dilemma: "atomic bomb (hydrogen bomb, atomic weapons)," "civil defense (local defense, war work)," "nuclear defense system," "nuclear disarmament (arms control, elimination, reduction, freeze)," "nuclear energy (atomic energy, nuclear power plants)," "nuclear testing," "nuclear war (nuclear attacks)," "nuclear waste (fallout, radioactivity," and nuclear weapons (arms)." It is interesting to note that "Star Wars" is the most specific form of air defense that the Gallup Poll considered worthy of polling. The following air defense terms did not appear as even a cross reference in the Gallup Poll's cumulative index to polls conducted during the Cold War: air defense, jets, Ground Observer Corps, radar, Nike.[59]

World War II and Vietnam remain prominent in American public memory for a variety of reasons. These reasons help highlight the way Cold War air defenses stand apart. Without a doubt Vietnam and World War II evoke far more traumatic memories of the sacrifices of American military personnel than America's Cold War air defenses. These memories often honor the simple foot soldier, because average Americans can relate to the

[59] Alec M. Gallup, *The Gallup Poll Cumulative Index: Public Opinion, 1935-1997* (Wilmington, Delaware: Scholarly Resources, Incorporated, 1999).

sacrifices of average foot soldiers. The jobs and sacrifices of Cold War missile and radar operators are simply not as well understood and idealized by the American people. This is similar to the way that Americans lionized firefighters for their sacrifices on September 11, 2001 rather than the Federal Aviation Administration and air traffic controllers who detected, identified, and attempted to coordinate the interception of the hijacked planes before they could cause any destruction.

Ideology and technology played a prominent role in these periods as well. World War II symbolized the triumph of American ideology and American military technology. Vietnam symbolized the failure of American ideology and military technology. Whereas America's most prominent World War II enemies, Germany and Japan, went on to become powerful democratic allies in the Cold War, the Vietnamese people remained unconvinced that capitalism was more righteous than communism. Perhaps more surprisingly, American military technology could not win the Vietnam War. American air power and atomic weapons, which devastated Japan and Germany in World War II, failed in Vietnam due in part to America's desire to contain communism without engaging in all-out nuclear war with the Soviet Union.

The military technology and anti-communist ideology that could not bring victory to the American soldier in Vietnam was formed in the 1950s and early 1960s when air defenses seemed crucial to national defense.

Eisenhower's "New Look" defense policy not only shrunk the Army's overall budget and manpower allocation, it oriented the Army on massive retaliation, which at that time relied upon an active air defense at home.[60] The Nike air defense missile system embodied Eisenhower's "New Look" policy in that air defense provided the security blanket massive retaliation relied upon.

When the "New Look" looked old and Kennedy's "Flexible Response" came into fashion, air defense suffered. Personnel shortages in South Vietnam yanked troops away from continental air defense. ARADCOM tried to institute its own flexible response to the situation, replacing active duty air defense personnel with full-time technicians and a National Guard staff, but this did not halt the demise of ARADCOM. Nike air defense missiles could not stop intercontinental ballistic missiles. Follow-on anti-ballistic missiles like the Nike Zeus also failed to meet this challenge. Although the Soviet Union still possessed bombers, experts believed initial nuclear missile attacks would be aimed at air defense sites as well as key military and industrial centers. While the "New Look" itself went away, the United States continued to rely upon massive retaliation to defend against a Soviet attack to the very end of the Cold War. The Army's role in that massive retaliation, however, ended with the demise of the Nike air defense missile system.

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[60] Timothy Osato, "Militia Missilemen: The Army National Guard in Air Defense, 1951-1967" (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1968) 220.

America's Cold War air defenses represent neither an ideological and technological triumph like World War II nor an ideological and technological tragedy like Vietnam. Their relative uselessness in a costly war far overseas in Vietnam minimizes public memory of them even more. Even the military devalued air defense during Vietnam. The cost of the Vietnam War and the drain on manpower made air defense missile sites very low priorities for men and materiel.[61] Fighter interceptor units, also crucial to America's early Cold War air defenses, lost some of their best pilots to duty in Vietnam. When they were not supplying fighting personnel for the conflict in Vietnam, air defense units served as official honor guards at military funerals. Air defense units became afterthoughts. As the nation fixed its attention more and more upon events in Vietnam, the government methodically shut down air defense installations. By the end of the Vietnam War in 1975 only a handful of the hundreds of these Nike air defense missile sites remained in the United States.

The Vietnam War severely traumatized America. The nation continues to deal with this trauma. Public regret over the way Americans treated veterans, the Prisoner of War/Missing in Action (POW/MIA) campaign, and countless books and films about Vietnam demonstrate how Americans continue to deal with public memory of the war. Thousands of Vietnam War

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[61] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 12.

memorials and monuments dot the nation. These memorials more often than not focus upon the sacrifice and service of soldiers more than any military technology or anti-communist ideology.

World War II memorials and monuments do the same. They are roughly as ubiquitous as Vietnam War memorials and monuments in the United States. Although World War II represents a great victory for American ideology and military technology, the monuments dedicated to World War II also commemorate the sacrifice and service of veterans (dubbed America's "greatest generation" by Tom Brokaw) more than ideology or technology.[62]

Few memorials to Nike service exist, and understandably so. While there was trauma and fear associated with some Nike operations, it paled in comparison to trauma and fear generated by deaths from a variety of more mundane causes. Nike sites also generated far less fear than the threat of attack from intercontinental ballistic missiles. In the psychological shadow cast by the trauma and fear of World War II and the Vietnam War, public memory of America's Nike air defense missile system appears hidden, even if Nike sites are not.

This work closes with a section on integrity: the characteristics that communicate the significance of historic properties. Preservationists rely upon integrity to ensure that something remains to be preserved in historic properties and that these integral elements can communicate historical

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[62] Tom Brokaw, *The Greatest Generation* (New York: Random House, 1998).

importance. The presence or absence, whether willful accidental, of features on historic properties both affects and reflects public memory. Every aspect of a historically significant property cannot possibly be preserved. From sensory components, like smell and noise, to the growth of vegetation, to the challenge of choosing the period or moment that will be preserved, preservationists make difficult decisions. What is preserved provides valuable insights into public memory and affects public memory as visitors attempt to experience the past. After evaluating the integrity of Nike sites in chapter seven, this work explores challenges inherent in Nike site preservation in chapter eight. Given these challenges, this section and dissertation ends with an examination of how to best communicate the significance of the Nike network.

Part III

Integrity

“Integrity is the ability of a property to convey its significance.”

- *How to Apply the National Register Criteria for Evaluation*, page 44

“…human modifications of the environment are often related to the way societies wish to sustain and efface memories."

- Kenneth E. Foote, *Shadowed Ground*, page 33.

7 Evaluating the Integrity of Nike Air Defense Missile Sites

In June 1971, while many Nike sites continued to guard America's skies from Soviet bombers, a group of Native Americans occupied vacant Nike site C-03 near Belmont Harbor, Illinois, on the banks of Lake Michigan. Led by Chippewa tribe member Michael Chosa, the group demanded this land and three other defunct Nike sites be deeded to Native Americans, paralleling similar seizures of deactivated Nike sites in other parts of the state and nation. Chosa's group contextualized the Nike sites as property rightfully due to Native Americans in recompense for centuries of federal seizure of Native American lands. They even managed to evoke the trauma of battle from a site that never experienced combat. In an onsite ceremony, Chosa dedicated the defunct base as a national memorial to Native Americans who fought for their property rights. Participants ceremonially draped a black casket with a red cloth and an American flag to symbolize lives lost in this struggle and, "patriotism even in oppression." In a presentation to the local Park District Board earlier in the day, Chosa declared, "Our backs are now at the lakefront. We have nowhere else. We will take no acts of violence against your people, but if we are oppressed further at this site, we will have violence." Their struggle did not go uncontested. After nineteen days police converged on the site and forcibly removed the occupants, arresting eight

amidst a hail of glass bottles and firebombs. Following the removal of the protestors, police locked the gates and the Nike site sat vacant once again.[1]

Chosa's vision for this former Nike site possessed imagination and merit. Then and now, hundreds of defunct Cold War air defense sites languish across the nation, possessed yet generally unwanted by the federal government and other property owners. This archipelago of federal or formerly-federal properties occupy land that reflects the diverse attributes of sites seized from Indians: urban and rural; beautiful and ugly; central and periphery; war-ready and strictly observatory; within yet outside of the communities around them; ignoring contemporary national borders; representing unified yet disparate groups; trauma-free yet representing a long, cold coexistence that occasionally flashed into hot conflicts, fueled by competing visions of property ownership, economics, and politics; where the American government used its military to forcibly seize land and displace its occupants. Like sites stripped from Native Americans, Cold War air defense sites exist in every state and require considerable interpretation to illustrate their significance. Additionally, most Cold War air defense sites languish, awaiting a new purpose. Beyond infusing new life into these sites, granting these lands to federally recognized Native American tribes across the nation

[1] "Indian Vows Defense of Nike Site Village," *Chicago Tribune*, 20 June 1971, 14; "California Nike Site Cleared of Indians," *Chicago Tribune*, 18 June 1971, A17; "Indians Vacate Nike Campsite at Argonne, Sign Housing Pact," *Chicago Tribune*, 21 August 1971, 3; "Indians Here Go for Broke in Protest – End with Nothing," *Chicago Tribune*, 3 July 1971, C11.

would be one way to symbolically atone for injustices done to First Nation people.

Perhaps most importantly, this Nike site could be historically interpreted for its significance to Native Americans, since it had once been Native American territory. In 1816, the band of Chippewa, Potawotami, and Ottawa who controlled the territory in and around Belmont Harbor ceded the land to the United States through the Treaty of St. Louis in the wake of the War of 1812.[2] Like all American soil, land used for every Nike air defense missile site in the nation was once controlled by Native Americans, and could thus be interpreted in that context.

Preserving C-03 as a site dedicated to the oppression of Native Americans would be problematic, however. Native American activists seized a number of properties at this time, chosen not for their significance to the history or public memory of Native American groups but because they were federal land, owned by the institution that stripped Native Americans of the vast majority of their territory over centuries.[3] In addition to ignoring C-03's

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[2] *Encyclopedia of Chicago,* "Treaties," [http://www.encyclopedia.chicagohistory.org/pages/1270.html], accessed 22 May 2008.

[3] To say this Nike site was the only government land seized for such purposes during this time would be taking the event out of context. The best remembered of these events occurred for nearly eighteen months on Alcatraz Island, ending during the occupation of Nike site C-03. Other seizures included land at Ellis Island; a former Army communications center in Davis, California; the Twin Cities Naval Air Station; a defunct Coast Guard station in Milwaukee; and Forts Lawton and Lewis, Washington. ["Alcatraz Indians Vow to Press On," *New York Times,* 20 June 1971, 38; Alvin M. Josephy, et. al.,

history as the very first Nike site to be equipped with the nuclear Hercules missile, Nike site C-03 does not possess the ability to communicate any historical significance it may have had to Native American people.[4] It lacks integrity.

Resources that are significant within a given context must also possess the physical attributes to communicate their historical significance to be considered worthy of preservation. Despite the continued existence of many defunct Nike sites, issues of integrity pose serious challenges to the preservation of what should be considered highly significant and even quintessential Cold War resources. Generally speaking, however, Nike sites possess the integrity to be designated historic and interpreted as Nike sites. This integrity is contingent upon careful restoration of missile site features, for deterioration and the Army's removal of key, character-defining equipment on these sites certainly provides challenges for preservationists.

The National Register of Historic Places divides integrity into seven aspects: location, design, setting, materials, workmanship, feeling, and association. Possessing several, and usually most of these aspects allows resources to successfully communicate their historical significance within a given context. Location is defined as the place where a historic event

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Red Power: The American Indians' Fight for Freedom, 2d. ed. (Lincoln: University of Nebraska Press, 1999) 44].

[4] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 63.

occurred or where a resource was built. In all but unusual circumstances (typically where a resource is significant strictly for its architectural merits) resources must remain in the location where they earned their significance to maintain integrity. The form, plan, space, structure, and style of a property collectively constitute the resource's design. When evaluating changes to the design of properties, portions of the property visible from the public right of way are generally considered the most important. The environment surrounding a historic resource is its setting. Rarely, if ever, do impacts to the senses beyond sight (hearing, smell, touch, and taste) receive consideration from preservationists evaluating integrity of setting. The physical elements used to build a property are its materials, and the physical evidence of the craft or technology required to assemble those elements constitutes a resource's workmanship. As with historical re-enactors, preservationists employ a broad definition of how authentic materials and workmanship must be. In general, unless they are completely deteriorated, materials and evidence of workmanship from a resource's period of significance must be preserved. The least tangible of the seven aspects of integrity is feeling, defined as a resource's portrayal of the history or aesthetics of its period of significance. Typically, integrity of feeling relies upon the presence of several other aspects of integrity that collectively constitute the particular feeling of a resource, with visual evidence again given primacy over other sensory data. Association constitutes the direct link between significant people or events

with resources. Like feeling, integrity of association is generally derived from the presence of other aspects of integrity. The possession of integrity of association and feeling alone, in the rare instances where that is possible, almost never enables a property to possess integrity.[5]

Surprisingly, formal evaluations of the integrity of Nike sites are rare. Among the five Nike sites listed in the National Register of Historic Places, only one site's integrity was assessed and explained on its nomination form, and the evaluators for Nike site HM-69 in Homestead, Florida did not discuss all of the seven aspects of integrity in their analysis.[6] The listing of all five of these sites in the National Register of Historic Places demonstrates that even the nation's highest ranking preservation officials have not disputed these sparse assessments, despite clearly being required by published National Register standards since well before any of these sites were nominated.[7] In a preliminary evaluation of Nike site C-47's eligibility for listing in the National Register of Historic Places, Keeper of the National Register of Historic Places Carol Shull noted the Nike Preservation Group's National Register nomination form "clearly establishes" that C-47 meets the National Register significance

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[5] National Park Service, *How to Apply the National Register Criteria for Evaluation* (Washington: U.S. Government Printing Office, 1998) 44-49.

[6] Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004, 8-9 to 8-11.

[7] National Park Service, *How to Complete the National Register Registration Form* (Washington, D.C.: National Park Service, 1972), 19-20; National Park Service, Notice, "National Register of Historic Places," *Federal Register* 34, no. 37 (25 February 1969): 2581.

criteria and is exceptionally important. She did not refute the Nike Preservation Group's claim that this site is the only "fully intact" Nike site designed to guard a "major potential target" which, if it were true, would call into question the integrity of the three other Nike sites listed in the National Register at that time, though she does state that relatively few sites remain with their historic integrity intact.[8] Rather than attempting to conduct an aspect-by-aspect analysis of the integrity of each Nike site listed in the National Register of Historic Places, this chapter will evaluate the integrity of Nike sites in general to illustrate the point that, while Nike sites generally retain integrity, issues of integrity pose significant challenges for communities and organizations considering preservation of extant Nike sites in their area.

All permanent Nike sites maintain integrity of location.[9] None have been moved, though individual buildings have been relocated in rare instances. The sheer weight of subsurface concrete and steel infrastructure characteristic of Nike sites makes their relocation highly impractical and borderline impossible. Location was a crucial aspect of Nike sites, and

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[8] Carol D. Shull, Keeper of the National Register of Historic Places, Letter to Constance Werner Ramierz, Jr., Director, Cultural, Environmental, and Accessibility Programs, General Services Administration, Public Buildings Service, Washington, D.C., 15 March 1999, C-47 File, Chicago: General Services Administration, 1.

[9] The scope of this dissertation is limited to permanent Nike sites in the United States, rather than the handful of temporary Nike sites quickly placed to provide some measure of defense in times of emergency (such as the Cuban Missile Crisis) or while permanent Nike sites were being constructed. The highly ephemeral nature of these temporary sites and their typical relocation to permanent Nike sites nearby their initial positions makes their absence in American public memory and historic preservation quite expected.

reflects the competing objectives of numerous constituents concerned about both the Nike and the nation. The Army's land acquisition team sought sites located close enough to defend cities, far enough from other sites to economize coverage, close enough to easily move troops from integrated fire control sites to launch sites, yet far enough to meet radar tracking requirements. Land between integrated fire control and launch sites had to have low to no vegetation or structures and a clear area close by to safely catch the Nike's massive, falling boosters. Nike site land had to be cheap, and for that reason the government first sought publicly owned land when considering terrain for Nike sites.[10]

The setting of Nike sites has changed in some cases, as new development begins to reach and alter the character of the landscape around many bases. These changes tend to come where Nike Ajax sites originally stood. Their twenty-five mile range necessitated their placement relatively close to the urban centers they defended. NY-53 in Middletown, New Jersey is a telling example of this. When it was demolished, a residential subdivision replaced not only the site but also the surrounding farmland. Nike sites

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[10]Program Review Division, Office, Director of Review and Analysis, Office, Comptroller of the Army, *Command Analysis, U.S. Army Air Defense Command* (Washington, D.C.: Department of the Army, Office of the Comptroller of the Army, 1963) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 9; Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 7 August 1957) 12; Mary T. Cagle. *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 182, 188.

principally designed for Hercules missile use tended to be located much farther from those urban centers, due to the vastly increased range of the Hercules missile. In many cases, suburban sprawl has only just begun to reach those sites if at all, as evident in Wheeler, Indiana. The farm fields that surrounded these bases remain, but residential development hovers in the distance. When it draws close enough, the land value will increase to the point where the cost of required environmental remediation and demolition of

Figure 50

Heritage Drive in Middletown, New Jersey provides no clues to the heritage of the small residential subdivision it winds through. On May 22, 1958, ten people died here on what was then Nike site NY-53 in America's worst Nike air defense missile accident.
Courtesy of Author

these Nike sites becomes a reasonable investment for a developer. Capitalism buried the Soviet Union in the Cold War and continues to do what the Soviet military could not: safely bury Nike sites. In general, however, encroachment into areas surrounding Nike bases is not sufficient to destroy a Nike site's integrity of setting. The principle purpose of Nike sites was guarding urban areas. Those urban areas grew while Nike sites remained active, so additional expansion is simply a continuance of a trend experienced by Nike sites during their heyday.

Figure 51

Nature may have taken over Nike site C-47L, but the site's setting, as seen from just inside the base's rusting perimeter fence, remains intact. Farm fields still surround the defunct missile base, though on the western horizon development from nearby Hobart slowly draws closer.
Courtesy of Author

The design of Nike sites was not completely uniform, yet sites were so similar that the design essentially became franchise architecture. Whether one considers them a mid-century franchise, Cold War "high style," or military "kit home," Nike sites have a highly distinctive design that enables even persons only familiar with them through secondhand sources to quickly identify buildings, structures, and objects on even highly deteriorated, adaptively reused sites. Most Nike sites had three magazines for underground missile storage, though there were rare exceptions. Nike site SF-88 just outside of San Francisco possessed only two of these underground missile "pits," probably due to the topography of the land and the close proximity of Nike site SF-87L.[11] But the absence of a missile magazine did not change the appearance of the site, as the site still needed buildings for functions required on all Nike sites. Additionally, these sites did not remain completely static in design during their active years.

Nike sites maintained a far more primitive look in their earlier stages than in later years. Like most Nike sites, SF-88 initially possessed very few paved surfaces. It also had only two semi-permanent buildings, both constructed of corrugated steel.[12] The Army agreed to improve site design

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[11] SF-87L is actually visible from SF-88, located roughly one half-mile away. [Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part II* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 8.]

[12] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry,*

and create recreation facilities for troops not solely to appease the public but also to improve low troop morale, increase what was initially a low reenlistment rate, and compensate for the long hours required at Nike sites. Paving gravel roads not only improved aesthetics for people living near Nike sites, it also improved living conditions for troops and reduced the dust blown onto complex radar equipment.[13]

Beginning in 1958 the Army made alterations to Nike sites in preparation for the arrival of the Hercules missile. Workers altered the elevators and storage magazines to accommodate the longer, heavier missile. Obsolete after only a few years, facilities used for fueling the liquid fueled Ajax were abandoned once the solid fuel Hercules arrived. A new warhead building provided a place for the classified and very technical assembly of missiles. The Army fenced off the launch area from the rest of the site, creating an “exclusion area” designated for the storage and firing of the nuclear missiles. Additional security improvements included the construction of sentry posts and guard dog kennels.[14]

The upgrade to the Hercules missile changed Nike sites substantially, and came with a cost that proved it. The contract awarded to a local firm for

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California, Part II (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 9.

[13] Steven Malevich, "Nike Deployment," *Military Engineer* (November-December 1955) 420.

[14] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part II* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 13, 17.

adapting SF-88's site for Hercules missiles was $1,738,753 for a conversion planned to last fifteen months. The site's original construction costs were only $1,250,000. While this was the most dramatic upgrade the Army made to Nike sites during their operation, the Army continued to make more minor upgrades to the equipment and architecture of Nike sites throughout their active lives. As late as April 1972, newly drafted plans depicted proposed construction on SF-88. A nation-wide program to upgrade Nike living areas in 1964 and 1965 caused the demolition of World War II-era buildings used as an administrative area by the personnel at SF-88 and the construction of new facilities to include barracks, a mess hall, and administrative buildings. When the first Hercules missiles arrived at SF-88 in 1959, soldiers assembled the nuclear weapon in a nearby coastal artillery fortification. The planned missile assembly and test building went unbuilt until 1962 for unknown reasons. The original generator shed at SF-88 lasted until 1965 when it was demolished and replaced by another building designed for the same purpose.[15]

Clearly, the restoration of Nike sites must include careful consideration of the period to which such sites will be restored. Even formal preservation of Nike sites, where all extant Nike features are retained, must consider interpretive methods. This interpretation should communicate changes in Nike sites over time, especially if the site's period of significance matches the

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[15] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part II* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 9, 11, 20-21, 23, 27, 31.

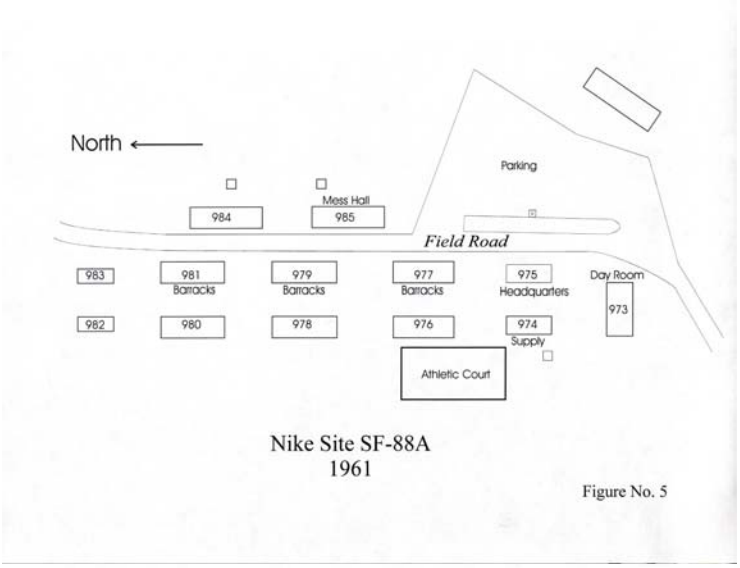
period of active defense on the site, as is the case with every Nike site currently listed in the National Register of Historic Places.[16]

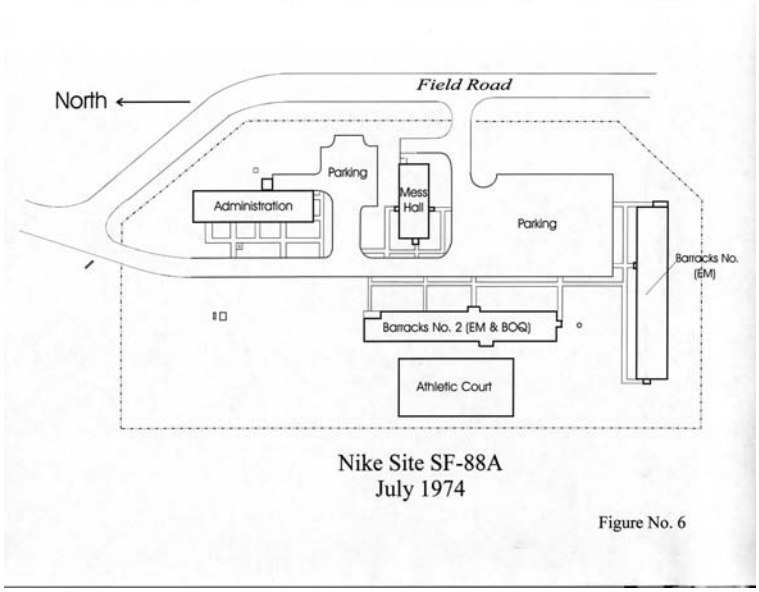
Unfortunately, none of the nomination forms of the five Nike sites in the National Register of Historic Places list the character-defining features of these sites or any Nike site in general, making judgments about permissible adaptive uses difficult for the organizations in charge of managing change on these sites. This lack of clarity also threatens the long-term survivability of these sites.

Still, since their period of military use, few extant Nike sites have experienced radical design changes. Missile magazines, the first example of the underground storage of nuclear missiles, are Nike sites' most distinctive character-defining feature. Like Nike sites, many Cold War air defense installations had radar towers, guard dog shelters, perimeter fences, and

[16] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

Figure 52





Nike site SF-88A is a telling though rare example of extreme makeovers of Nike sites and differences between Nike sites. From 1964-1965 the Army replaced the World War II barracks used as housing for Nike personnel on Fort Barry with facilities common to Nike sites constructed in areas outside of military bases. *Courtesy of NPS/Golden Gate NRA*

buildings of all sorts. No other American air defense site had underground missile magazines. These pits are also undoubtedly their most enduring characteristic, for demolition of these magazines requires tremendous effort. While these magazines were not designed to withstand direct hits from nuclear weapons, they were designed substantially enough to protect highly sensitive Nike air defense missiles on standby from the powerful blast of other Nike missiles being launched.

Paradoxically, they are arguably the first portion of Nike sites to deteriorate and the most difficult feature to preserve well. Seepage of water into underground magazines remains a constant problem, as it was in 1964 when most Nike magazines were still in their prime. Cracks in floors, walls, and conduit entrances permitted the seepage of groundwater into missile bays.[17] Nearly thirty-five years after the deactivation of all but a handful of Nike sites, groundwater and rainwater have turned many of these magazines into subterranean pools. Moisture rusts the steel beams. Freezing water and shifting earth crack the concrete components. While buildings on Nike sites have been adapted to a wide variety of uses, these underground missile magazines remain the most difficult feature to adaptively reuse.

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[17] Headquarters, United States Army Air Defense Command, *Programming Information, Fiscal Year 1965 and Fiscal Year 1966* (Colorado Springs, Colorado: Headquarters, United States Army Air Defense Command, 1964) U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, chapter 5, page 8.

Figure 53

An open personnel entrance to Nike site C-47's underground missile magazines reveals a problem common to extant Nike sites. Water frequently floods their most distinctive character-defining feature.
Courtesy of Author

Though other Cold War air defense sites certainly had guard shacks, radar towers, barracks, and other features found on Nike sites, their retention is still important to fully interpret Nike sites. Often, these features remain, but the Army removed radomes from Nike sites when it departed. Many Nike sites possess radar towers upon which the radomes sat, however, and with

photographs and interpretive placards, the missing radome need not be a signal that the integrated fire control site in question does not retain integrity. Creative restorations might include a safe stairway to a viewing platform at the top of the tower. From such a perch, visitors could gain a better perspective on the site's relationship to its launch and administrative areas; the area it guarded; and the passage of time onsite, whether characterized by environmental or developmental (urban expansion) encroachments. Abandoned Nike sites have become homes for a surprising variety of plants and wildlife. Their takeover of a site formerly defending itself and the area with the world's most powerful weapons certainly evokes interesting interpretive opportunities.

Features smaller than missile magazines and radomes are far easier to remove, and they have been. The Army's departure took most technical objects such as missiles, computer guidance systems, radar sets, refueling equipment, and maintenance materials. These materials can be recovered, though such recovery takes research, patience, and money, for the production of Nike equipment stopped years ago. The National Park Service estimates that volunteer-driven requisition and restoration at Nike site SF-88 in the Golden Gate National Recreation Area have saved taxpayers thirty million dollars.[18] SF-88's restoration is admirable, but it only includes a

[18] National Park Service, *Partnerships: Fort Barry Nike Site SF-88 Volunteers* [http://www.nps.gov/partnerships/ fort_barry_nike_site.htm], accessed 31 August 2008.

portion of one, smaller than average launch site. Nike sites can, however, be successfully preserved and interpreted with less than one hundred percent of their former objects. Integrity of materials and workmanship, clearly evoked by much of this smaller equipment, is not lost with the removal of some of these telltale objects.

Often the buildings most suited to adaptive reuse are barracks and non-specialized, above ground, cheap, quickly constructed buildings. In an age of rapidly developing defense technology, even the most basic buildings stood a strong chance of outlasting their required functions on Nike sites, thus cost and function dictated the design and durability of most Nike site buildings. In that sense, the materials and workmanship involved in the construction and upgrading of Nike sites often runs counter to preservation instincts. These buildings were generally intended to be disposed of, not preserved or restored. Yet more durable building materials and specialized workmanship comes with its own preservation challenges. Concrete, steel, asbestos, and plastics can all be conserved but the technology required to do so is generally beyond the means of average Americans, unlike the technology needed to care for woodwork. This makes the preservation of materials and workmanship on Nike sites that much more difficult for local agencies and individual property owners with fewer resources than the federal government had during the Nike system's operational era. There is, however, no "mint condition" requirement for a resource to possess integrity.

The deterioration of various materials will undoubtedly hinder those seeking to remove all traces of the years since a Nike site's defensive days, but others appreciating that deterioration can use evidence of the passage of time to illustrate important points about preservation and post-World War II construction.

Figure 54

Materials used at Nike sites such as reflect the belief that base buildings like this one at C-47 would outlast the defensive technology they supported. While this proved true, the poor longevity of Nike site construction creates serious challenges for preservationists.
Courtesy of Author

Integrity of association is somewhat problematic for Nike sites in general. Although Americans clearly knew about Nike sites during their operation, public memory of Nike sites is extremely limited. Historical narratives of the Cold War at best marginalize the significance of air defense. With such a marginal foundation for Nike sites within the collective consciousness, Nike sites have had to rely upon their physical features to retain integrity of association. Few, if any, have done so successfully. Without their missiles and ever-present population of soldiers, these bases resemble many formerly used industrial sites and evoke little association with Cold War watchtowers. The end of the Nike program, death of missile-based bomber defense in the United States, lack of American anti-ballistic missile defenses, and demise of the Cold War further limit the ability of sites to retain their integrity of association. The difficulty inherent in adaptive reuse has frequently resulted in the transfer of Nike sites from user to user, helping to further mask the site's original association.

Then again, difficulties adaptively reusing sites generally mean that Nike defenses remain the longest-standing use for the site, and thus evoke the strongest associations. Even when adaptively reused, the highly similar architecture used on these sites and difficulty inherent in remolding those physical remnants does provide former Nike sites a decent degree of association with the Nike system as well.

Nike missile sites have been adapted to a variety of uses. One 1980s bumper sticker wished for a world where schools had all the money they needed and the Air Force had to hold a bake sale to buy a new bomber. While schools continue to struggle for funds and the federal government never held a bake sale to fund nuclear delivery systems, the government did transfer Nike sites to educational institutions from public and private elementary schools to Harvard University. Nike launch sites on the east and west coasts became marine science centers. Fire department training sites, police firing ranges, homeless housing, an insect and disease lab, and even private residences all evolved from what were once Nike missile site buildings and structures.[19] In most cases, however, new uses of old Nike sites tend to rely upon ancillary buildings, not the structures crucial to missile operations such as the missile magazines, since few contemporary uses benefit from being underground in concrete bays with lift elevators. In his book *How Buildings Learn: What Happens After They're Built* writer Stewart Brandt postulates that the best architectural designs are those that produce the most adaptable buildings.[20] Nike sites are difficult to adapt to new uses without serious reconfigurations that threaten to destroy the site's integrity. A driver's

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[19] The former launcher site of B-85 in Bedford, Massachusetts became a zoological study facility for Harvard University. [Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-179.]

[20] Stewart Brandt, *How Buildings Learn: What Happens After They're Built* (New York: Penguin Books, 1994) 24-33.

education course, paintball complex, communication site, military training facility, and maintenance storage yard are all adaptive uses of Nike sites that do not preclude these sites from being listed in the National Register of Historic Places. Nevertheless, none of these utilize the underground missile magazines which are undoubtedly the preeminent character-defining feature on Nike air defense missile sites, and none require preservation of the existing buildings to any extent beyond preventing roofs from leaking.[21] Of the five Nike sites in the National Register of Historic Places, HM-69 in Homestead, Florida has been best adapted to new uses. National Park Service staff have converted above ground buildings on these sites into offices and storage buildings for Everglades National Park's natural and historic collections. The high water table in the area and ample supply of federal land produced above ground missile storage magazines on this site. Protective earthen berms originally designed to direct the force of inadvertent explosions upward now shelter the buildings from hurricanes that plague the area, making the structures a safe haven for Park Service boats pulled from

[21] Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.

the water shortly before storms.[22] The above ground nature of these magazines may make them more adaptable, in general, but has not guaranteed reuse of Nike missile magazines. Rocky, frozen permafrost in Alaska and plentiful government-owned land resulted in above ground missile storage magazines at Site Summit, though no viable use has yet been found for those buildings.[23]

As enduring as underground, steel and concrete Nike missile bays are, successful adaptive rehabilitations of these features have proven equally ephemeral. In Long Beach, California, local governmental and emergency organizations established an emergency operating center in the missile magazine of the Nike site there, complete with a medical clinic capable of performing minor surgery. Sometime between 1980 and 2002 the site was demolished and replaced by a commercial development.[24] A late 1980s conversion of a Needham, Massachusetts Nike missile magazine for use as computer data storage lasted even less time. By 2002 the site had been

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[22] Nancy Russell, E-mail to Author, 19 May 2008.

[23] The Army also constructed above ground missile magazines in other areas where land acquisition was no real issue, such as at Strategic Air Command bases and in Greenland. [Russell H. Sackett, Janet Clemens, and Joe Norrell, *Management of a Nike Site: A Feasibility Study for Management of Nike Site Summit, Ft. Richardson, Alaska* (Anchorage: Alaska Office of History and Archaeology, 1997) 48, 61-62; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43.]

[24] "Subterranean Center to Direct Recovery Effort in Event of Disaster in Long Beach," *Los Angeles Times,* 17 August 1980, SE_B1; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 108.

demolished and deeded to the City of Needham.[25] These users did not have to preserve the integrity of these Nike sites because they were not considered historic. Even absent the confines of preserving character-defining features, these two local governments found the design of these Nike sites so difficult to reuse that they resorted to demolition instead.

Part of the difficulty gauging integrity of association at Nike sites is determining exactly what Nike sites should be associated with. To be listed in the National Register, properties must possess a period of significance during which they achieved their significance under a particular criterion. Nomination forms indicate that all five Nike sites listed in the National Register are historically significant under criterion A due to their association with important events during their period of significance. For the three individually listed sites, this is the entire period during which each site defended the nation.[26] Collectively, these periods run from 1956 to 1979.

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[25] "Computer Files at Home in Former Missile Silo," *Chicago Tribune*, 14 November 1988, 8; Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 55.

[26] The two Nike sites within historic districts have far larger periods of significance emblematic of not only the defensive watch of Nike sites but previous fortifications within the district as well. [Harry Butowsky, *National Register of Historic Places Inventory-Nomination Form: Fort Hancock and the Sandy Hook Proving Ground Historic District*, 1982; Janet Clemens and Russ Sackett, *National Register of Historic Places Registration Form: Site Summit*, 1996; Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973; Don Peterson, *National Register of Historic Places Registration Form: Nike Missile Site C-47*, 1998; Diana Welling and Jennifer Dickey, *National Register of Historic Places Registration Form: Nike Missile Site HM-69*, 2004.]

Apart from this period's association with the middle of the Cold War, historians have drawn few common connections between the disparate events during this time. The evaluators who nominated these five Nike sites to the National Register also fail to create such linkages, relying instead upon the Nike's association with Cold War air defense, clearly marginalized in American history and public memory.

Far less tangible than integrity of association is integrity of feeling. The feeling evoked from most Nike sites is fleeting, at best. Integrity of feeling is generally comprised of the presence or absence of several other aspects of integrity that allow a resource to communicate its aesthetics and history within a given period of significance, making it an appropriate place to draw conclusions about the integrity of Nike sites in general. All extant Nike sites retain their integrity of location, though individual buildings have occasionally been moved. Most retain their integrity of setting, though suburban sprawl continues to threaten that setting. The design of Nike sites is so specialized to the sites' original function that sites tend to retain their integrity of design if the site has not been demolished completely. Deterioration of materials and difficulties preserving the workmanship on Nike sites pose challenges, but few property owners have upgraded existing Nike site features. In most cases, original features and workmanship remain in place, though in a deteriorated state. Limited association, mentally and physically, between remaining sites and their original function hinders preservation and further limits public

memory of this air defense system. Still, the difficulties inherent in adaptively reusing Nike sites makes Nike defenses the longest use of almost all Nike sites, leaving the integrity of association of the sites intact for those who remember the sites' original purpose. In short, Nike sites generally possess integrity of feeling with careful restoration of missing features, like inert Nike missiles and signage.

Even when Nike sites possess their ability to communicate their historical significance, issues beyond integrity hamper preservation efforts and continue to limit public memory. Those pitfalls should be carefully considered before local communities embark upon the preservation of Nike sites.

8 Preservation Pitfalls

America's Cold War air defenses may be forgotten, but they are not gone. As of 2002, one survey indicates 78-86% of all Nike air defense missile sites in the United States remained at least partially intact, making preservation of all or some of hundreds of Nike air defense missile sites by local agencies, nonprofit organizations, and governmental bodies a possibility.[1] Nevertheless, extremely few have been preserved. These opportunities are difficult to take full advantage of, since even the most intact of remaining sites are missing the majority of the equipment required to run the site. Deterioration, too, poses serious pitfalls for preservationists to avoid. On Nike sites, those pitfalls are not only figurative but literal, as two construction workers who fell through a supposedly intact Nike missile pit door realized, nearly fatally, in 1985.[2] Their pitfall is also the pitfall of preservationists trying to find adaptive uses for these character-defining underground storage rooms and elevators. The difficulty inherent in preserving Nike air defense missile sites limits preservation of these sites,

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[1] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-179.

[2] In 1985, only twenty-two years after a Nike site in Naperville, Illinois was closed and far less than fifty years since the sites were constructed, two workers sustained serious injuries when a missile elevator door they were walking upon collapsed. ["Two Injured in Fall at Old Missile Silo," *Chicago Tribune*, 20 March 1985, 5.]

thereby providing one less cue for public memory of the Nike system. The lack of prominence of the Nike system in American public memory, in turn, inhibits preservation of Nike sites because few know of or care about this highly significant archipelago of Cold War defense.

Possessing significance within a given context and the integrity to communicate that significance may be enough for the National Park Service to feel a Nike site should be preserved, but preservation at the local level usually requires more. Communities invest their money in their values, and may balk at preserving sites that could be said to glorify nuclear war or make it seem winnable. Additionally, military sites receive a tremendous amount of attention in the world of preservation. Critics frequently claim that military sites honor the contributions of none but white males to history. Preservationists need to demonstrate that Nike sites honor a broader history of value to all. For

Figure 55

"Not a single window pane is unbroken in any of the buildings. Beer cans are everywhere and walls are battered and show signs of being targets for practicing riflemen and pistoleers. A rusty old hulk of a red car sits near the front gate. Obscenities grace not a few of the concrete block structures as honeysuckle crawls on to the concrete pads from the waist-high grass and weeds. It's a quiet place, but calls forth no ghosts of times past."

- Newspaper description of a defunct Baltimore Defense Area Nike missile site in 1972

example, Nike sites illustrate major changes in the roles of women and minorities in federal agencies during the 1950s and 1960s. But relying upon a desire to honor particular groups may require some fancy footwork on the part of preservationists if sites are allowed to remain in a state of arrested decay or allowed to deteriorate completely. Ruined sites, at least in the United States, tend to communicate neglect and a lack of respect. Yet no one perfect method of preserving the history of Nike sites need be found and practiced. Some sites can be restored, others left in a state of arrested decay, more interpreted online, and still more marked. These sites have the power to change the way we think about the Cold War, regardless of the form in which we remember them.

Preservationists must ensure they have an adequate mandate to preserve their Nike site before they attempt to seek historic designation or to preserve the site itself. Even the best-preserved Nike site, SF-88 near Sausalito, California, maintains a tenuous preservation mandate at best, despite being owned and interpreted by a public agency. Upon its deactivation in 1974, SF-88 was transferred to the National Park Service to be retained as "…an Historic Memorial to Air Defense - NIKE Hercules."[3] The Army offered to give the National Park Service everything related to the

[3] Fran M. Roberts, Chief, Real Estate Branch, "Memorandum for the Record, 25 February 1974, Operation Concise/Outline of Real Estate Actions, Presidio of San Francisco," Folder "BBC-Excessing the Nike Site SF-88: 3 July 1974," Box 4, Army Text Files, APWEMR-4, Golden Gate National Recreation Area Park Archives, San Francisco, California, 1-2.

launch, integrated fire control, and administrative sites except for weapons and classified materials. The Army also offered to pay technicians to remain on site to maintain all equipment until personnel in the newly formed Golden Gate National Recreation Area (GGNRA) could receive training on the Nike system at Fort Bliss, Texas, where Nike soldiers received their training on the missile system.[4] Even with all of these resources and opportunities the National Park Service remained reluctant to preserve SF-88.

William Whalen, first superintendent of the Golden Gate National Recreation Area, initially turned down the opportunity to manage SF-88s integrated fire control site, feeling the equipment too complex, the location too remote, and the weather too harsh for his small staff to adequately care for and interpret. He did indicate interest in the administrative area, feeling it was well suited for reuse as a conference center; hardly evocative of the Nike's past and hardly a memorial to the service of Nike personnel. Whalen eventually agreed to let the Army transfer all three sites without the integrated fire control equipment, but final transfer of the sites did not occur until 1976.[5] To this day, SF-88s integrated fire control site remains abandoned high atop Wolf Ridge.

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[4] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 68.

[5] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 68-69.

Figure 56

SF-88C's generator building retains the form and materials it possessed in 1961 (top) but the removal of doors, windows, equipment, and upkeep have left this building severely deteriorated and highly representative of the state of the site in general.
Courtesy of Author

While the architect who prepared SF-88's National Register of Historic Places nomination form managed to convince the Keeper of the National Register of the site's significance, he could have done a better job convincing National Park Service officials. Indeed, evidence from his nomination form indicates a puzzling lack of information and analysis. SF-88 is part of a district listed in the National Register of Historic Places and the California Register of Historical Resources, since everything in the National Register is automatically included in the California Register. The district includes former property of Forts Baker, Barry, and Cronkhite, also located in the Marin Headlands with SF-88. When it was nominated and listed in the Register in 1973, SF-88 was not only still an active Nike air defense missile site, it was less than twenty years old; a far cry short of the fifty-year standard for considering properties eligible for listing. The nomination form notes the site possessed future historical value but could not be described due to its "top secret" status, not borne out by the numerous media spotlights and public tours conducted at SF-88 over many years. The form does not list the other Nike sites located within the boundaries of this historic district, despite the fact that both Forts Baker and Cronkhite possessed Nike units. Fort Baker had a headquarters element that remained open until 1974. Fort Cronkhite possessed Nike site SF-87 that closed in 1971. The nomination form does mention that one other Nike site closed prior to 1973, but gives no details about it, nor does it bother describing the contents of the site, despite

obviously having lost any “top secret” status it may once have had. The nomination form states that SF-88’s integrated fire control site had twenty to thirty buildings, far more than the actual number, making one wonder if the evaluator had even seen the site or any Nike site. Somehow this historic district nomination, which consisted primarily of coastal defense structures, did not include the buildings designed to supply those coastal defenses, despite the fact that the administrative and integrated fire control sites of SF-88 were included in the district simply based upon “future historical value.”[6]

Figure 57

SF-88C, 1970. Although photos of Nike sites routinely appeared in *ARADCOM Argus* and on aerial photograph sheets around the nation, security concerns allegedly prevented the inclusion of a site description on SF-88’s National Register nomination form, despite being prepared on the eve of the base’s closure.
Courtesy of NPS/Golden Gate NRA

[6] Thomas Lile, *National Register of Historic Places Inventory-Nomination Form: Forts Baker, Barry and Cronkhite*, 12 December 1973.

Yet the designation of the administrative and integrated fire control portions of SF-88 was clearly appropriate. All Nike sites required administrative and integrated fire control sites, sometimes collocated. Preserving Nike launch sites alone is like preserving a courtroom while ignoring the rest of the courthouse. Yet the Army stipulated Nike launch and integrated fire control sites be spaced roughly ½ to 3 ½ miles apart, much farther than visitors can comfortably walk, making their interpretation difficult.[7] SF-88's launch site is one-half mile from its administrative site and more than two miles away from its integrated fire control site. High atop Wolf Ridge, the integrated fire control site can only be accessed along a single lane road that becomes treacherous when fog and wet weather descend on the area. The distance between the launch and integrated fire control areas at SF-88 caused two National Park Service historians to recommend a replica, scaled down integrated fire control site be created closer to SF-88L.[8] In lieu of this faux, off-site reconstruction, staff have moved radar components to the launch site itself, and explain the discrepancy during guided tours. The Golden Gate National Recreation Area continues adaptively using SF-88's administrative area as a conference center while keeping it preserved.

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[7] Army Regulations (AR) 210-30, *Installations: Selection of Sites for Army Installations* (Headquarters, Department of the Army, Washington, D.C., 7 August 1957) 13.

[8] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part II* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 14, 89.

Figure 58

High atop Wolf Ridge, in the background depicted between these two radar units, sits SF-88's actual integrated fire control site. The distance and remoteness of SF-88's integrated fire control site as well as a lack of funding and personnel have caused the National Park Service to relocate these radar units to SF-88s launch site and essentially abandon its control site.
Courtesy of Author

Onsite interpretation, crucial to establishing and maintaining a mandate for preservation, has fluctuated since the National Park Service acquired SF-88. With the departure of the Golden Gate National Recreation Area's Chief of Interpretation during the site transfer from the Army, park officials neither interviewed departing personnel nor sent park staff to Fort Bliss for Nike

system training.[9] In autumn 1974, a mere three months after it closed, park officials began granting limited tours of SF-88.[10] Volunteers began restoring the site in 1983 or 1984, but not until volunteers from the Military Vehicle Collectors Club logged more than 600 hours cleaning up the site in the late1980s was the site opened to anyone but the occasional small, pre-arranged guided tour.[11] Today, the site is open to the public three days a week and includes guided tours. Once per month an open house attracts Nike veterans to the site to share their experiences with visitors.[12]

While harnessing the expertise of veterans who actually worked on these sites is critical to any Nike preservation effort, the mandate for preservation should ideally come from another source, since veterans do not live forever. Yet even at SF-88, a park funded by the federal government, the veterans at SF-88 have been the ones motivated to restore and display this missile site. Located inside the Golden Gate National Recreation Area, the

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[9] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 68.

[10] Terry Abel, Interview by John Martini, 7 June 1992, Interview GOGA-18811, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 45.

[11] Susan Tasaki, ed., *Nike Missile Site SF-88* (San Francisco: Golden Gate National Conservancy, 2004); National Park Service, *Partnerships: Fort Barry Nike Site SF-88 Volunteers* [http://www.nps.gov/partnerships/ fort_barry_nike_site.htm], accessed 31 August 2008; "Nike Tour in Marin: A Look at a Missile Base," *San Francisco Chronicle,* 4 August 1989.

[12] Golden Gate National Recreation Area, *Nike Missile Site*, [http://www.nps.gov/goga/nike-missile-site.htm], accessed 17 May 2008.

National Park Service has allocated only one Ranger, a park electrician, to oversee all operations on this site.[13]

Investigating the evolution of Nike site design is another pitfall of Nike site preservation. The Army did not require Nike batteries and battalions to write unit histories, thus few details about each site and its operations exist.[14] Standard architectural plans and records kept by larger Nike units do enable researchers to learn some details about these sites when these documents have been surrendered to the National Archives. Yet a federal preoccupation with secrecy has kept many primary and even secondary Nike sources partially or totally off limits to persons without secret security clearances. Approximately 20% of the official history of the Nike Hercules missile system remains classified to this day, nearly thirty years after military officials declared the Nike system obsolete and deactivated all but a handful of American Nike sites.[15] The reasons for this redaction are unknown. The Freedom of Information Act requires declassification agencies indicate the exemption used to withhold the release of information next to each redaction

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[13] National Park Service, *Partnerships: Fort Barry Nike Site SF-88 Volunteers* [http://www.nps.gov/partnerships/fort_barry_nike_site.htm], accessed 31 August 2008.

[14] "History of the 45th Air Defense Artillery Brigade" (Fort Sheridan, Illinois: 45th Air Defense Artillery Brigade, United States Army, 1972), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, I-1.

[15] Mary T. Cagle, *History of the Nike Hercules Weapon System,* Historical Monograph Project Number AMC 75M (Redstone Arsenal, Alabama: U.S. Army Missile Command, 1972).

in declassified documents.[16] This requirement is rarely followed, in the experience of this author.

Even annual histories of ARADCOM itself, the parent unit of all Nike air defense missile units in the contiguous United States, remain classified. A lengthy Freedom of Information Act (FOIA) request placed by this author bounced around from agency to agency for several years as organizations stated they had no authority to review these documents for declassification. The Department of Energy (DOE) declassified portions of the documents related to nuclear secrets. DOE staff then sent the documents to the National Archives and Records Administration (NARA) to consider declassification of these records somehow still partially under the auspices of the North Atlantic Treaty Organization (NATO). The National Archives authorized release of the documents and then the Army suddenly rescinded that authorization. After having previously waived its right to review the declassification, Fort Bliss, Texas changed its mind, and required another FOIA request to declassify these documents. Fort Bliss continues to review this request as of Fall 2008. The one positive aspect of this ordeal was the Army's release of portions of

[16] Department of the Army, Freedom of Information and Privacy Acts Office, *A Citizen's Guide To Request Army Records Under The Freedom of Information Act (FOIA),* (Washington D.C.: Department of the Army, 2003) 5 [http://www.poa.usace.army.mil/oc/citizens%20guide%2003.doc], accessed 27 October 2008.

the documents declassified by the Army in 1991 but never released to the public.[17]

These proceedings defy logic. Federal officials resoundingly declared the Nike system obsolete over thirty years ago, so obsolete that the even maintaining the sites in a mothball status was not deemed cost effective, yet somehow unit histories of this command remain classified. The idea of classifying unit histories is perplexing by itself. Unit histories are important documents that should be released to the public, otherwise why would the government take the time to write a history of a defense agency? Yet the information contained within the documents cannot really be considered that sensitive, otherwise why would the government have been so silly as to include such information in a unit history, rather than keeping the information segregated in secret sources?

The situation extends far beyond Nike sites and includes federal Cold War records in general. Indeed, the problem became so acute that in 1994 the Organization of American Historians compiled a report and series of recommendations on the declassification backlog of federal records for the United States Department of Defense Legacy Resource Management Program.[18] Unfortunately, these problems continue, even among historians

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[17] Frank Shirer, E-mail to Author, 15 January 2008; Darren Pohlmann, E-mail to Author, 27 August 2007.

[18] Page Putnam Miller, The Declassification Backlog of Historic Records: A Problem For Both the Department of Defense and All Those Who Seek a Better Understanding of the Cold War, A report prepared for the

employed by the federal government. Two National Park Service historians ran into so many problems gaining access to documents about a Nike missile site declared a memorial over twenty years earlier that they complained about it in the first few pages of their history and preservation plan for the site.[19] Another historian preparing a report documenting Cold War resources in South Florida noted similar restrictions.[20] Restrictions on Nike system information will likely continue to hinder preservation of Nike sites for some time to come.

The difficulty accessing these sources not only complicates preservation's technical aspects, it also hinders the ability of communities to take emotive ownership of these sites. Truly successful preservation efforts need clear constituencies with relationships to policymakers and nonprofits who can provide funding and legislation designed to aid preservation. The sheer number of Nike sites, their small size, and their dispersed placement across the United States make the federal government an ineffective steward of these sites, for they merit very little recognition within the massive bureaucracy that has to deal with far larger military base closures. Local

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United States Department of Defense Legacy Resource Management Program, December 1994, [http://www.fas.org/sgp/eprint/legacy.html], accessed 31 August 2008.

[19] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) i.

[20] Steve Hach, *Cold War in South Florida: Historic Resource Study* (Atlanta: National Park Service, Southeast Regional Office, 2004) 69.

communities, who have the best opportunity and the largest reasons to consider the bases an important part of their history, have high hurdles to leap if such mundane information as unit histories are locked up at the federal level.

Procedural requirements often hinder preservation of Nike sites as well. Professional historic preservationists set extremely high standards for themselves that are usually unattainable by grassroots preservation efforts. Even the most formal of Nike preservation efforts have difficulty meeting professional preservation standards. The authors of a lengthy, two-part interim history and preservation plan for SF-88 focused solely upon the launch site, and noted that the study would need to be followed by additional studies to include a full historic structure report, historic resource study, and historic furnishings plan before the launch site could be truly preserved the right way.[21] The National Park Service has yet to commission these studies, despite SF-88 being the best preserved Nike missile site in existence.

A historic structure report on Nike site C-47's launch area is another example of these high standards. The document spans one hundred sixty pages; uses the Secretary of the Interior's Standards to guide preservation recommendations, to include accessibility and security recommendations; identifies extant components inside buildings, listing their manufacturer,

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[21] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) i-ii, 68.

catalog number, voltage, horsepower, and a host of other attributes; includes measurements for a tremendous amount of components and buildings; and has existing colors matched to Sherwin Williams palette numbers. Despite the depth of the report, the author does not suggest interpretive content, evaluate the IFC site, or get into what she titles a “full management and preservation plan.” [22] While studies like these are certainly in keeping with professional preservation practices, their rarity, especially among Nike sites, and their cost and complexity keep them beyond the reach of all but a rare few Nike sites.

Maintaining obsolete technology is another major challenge faced by preservationists of Nike sites. Like some buildings on Nike sites, the missile systems themselves came standardized and prefabricated, with final assembly occurring onsite. The missile systems were also built with planned obsolescence in mind. The Army began work on the Nike Hercules even before installing the first Nike Ajax site, and did the same with the planned, anti-ballistic successor to the Nike Hercules, the Nike Zeus. The basic technology relied upon by these missiles is obsolete. Technical information on the operation of such technology is difficult to find. Information about preserving such technology, much of it relying upon vacuum-tubes and transistors, is virtually nonexistent. The Nike Ajax fire control system (not the expendable missile) is made up of approximately 1.5 million pieces, not that

[22] Anjanette U. Sivilich, "Wheeler/Portage Nike Missile Launch Site C-47: Historic Structure Report" (Thesis, Ball State University, Indiana, 2000) 6.

preserved missile sites absolutely need all of those pieces, but good preservation requires at least some.[23] Hercules missiles and their accompanying radar elements had a design life of ten years, after which time moving parts and components needed to be replaced.[24] Preservation of these missiles obviously does not require they be kept fully functional. Still, this replacement cycle does help demonstrate the fragility of the missile even when stored underground, much less above ground in the elements where they are more accessible to members of the public. This technology is also quite difficult for the public to understand. SF-88, a restored Nike Missile site near Sausalito, California, relies on veterans who actually used such technology during their military careers and engineers to interpret and maintain the site.

Preservationists need to think carefully before flooding local, state, and national registers of historic resources with properties that dilute the importance of significant resources, exhaust the limited preservation funding that exists, and weaken the public mandate for preservation in general. Preservationists need to ensure they possess and maintain a public mandate to preserve these sites and ensure their longevity. Once the military believed

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[23] Jack K. Emry, *Blazing Skies: From Ajax to Zeus* (Bend, Oregon: Maverick Publications, 1990) 115.

[24] United States Army Air Defense Command, *United States Army Air Defense Command Readiness Presentation: The Secretary of the Army's Program for Command Supervision of Readiness* (Washington, D.C.: Department of the Army, 11 June 1968), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 27-28, 104.

Nike air defense missiles were no longer of use, Nike sites closed. Should the general public and organizations in charge of preserving Nike sites ever determine preserved Nike air defense missile sites are no longer important, they will be closed just as abruptly. In short, inappropriate rationale for preservation threatens the long-term viability of any historic site. Thankfully, formal preservation is not the sole option for remembering and recording these air defense sites.

If not formal preservation, what should be done with defunct Nike missile sites? Documentation of such sites, usually including large format photography, measured drawings, and sometimes a written history, is frequently chosen as a method of mitigating the loss of such sites; yet nine Nike air defense missile sites have already been recorded by the Historic American Engineering Record (HAER) according to the records of the Library of Congress as of September 2008. This documentation does not usually try to assess the impact of the site upon the landscape and community around it, which is arguably the most important information to record for local communities with Nike air defense missile sites. While there were some variations in the design of each Nike site due principally to the terrain, Nike sites were designed from standard plans generated in Washington D.C. How many of these sites, designed to be interchangeable in terms of layout, mission, equipment, and personnel, should really be documented to HAER standards? The federal government has not treated Nike sites as

interchangeable, listing five in the National Register of Historic Places before any turned fifty years old and requiring the documentation of nine of them by the Historic American Engineering Record.[25]

Others call for Nike sites to be turned into museums, but this involves some historic preservation as well. The underground construction, with water seepage problems, and above ground construction, poorly suited for the climate controls required for good museums, would make operation of a museum on a former Nike site difficult. Without preservation of the site's extant features, any museum on a Nike site would quickly become an eyesore, thus any effort to convert a Nike site into a Cold War museum must first be led by Nike site preservation.

Nike bases represented just how far our nation was willing to go to win the Cold War. The idea of defensive nuclear missiles designed to explode no more than 125 miles over a major city seems preposterous to us now, yet there the sites sit. Maybe the sites are best left as ruins, abandoned by the nation as the Cold War shifted from the irrational to the insane, or from hope to resignation. Perhaps they are emblematic of the role of economics in Cold War strategy, in this case abandoning defenses in part because they were no longer cost effective. Unfortunately, these ruins are far more fragile than the ruins of Roman roads and medieval castles for, although designed to defend

[25] Online Library of Congress records (http://memory.loc.gov/ammem/index.html) indicate HAER documentation of the following Nike sites: D-57/58, C-84, SL-40, Summit, Tare, MS-40, PR-79, LA-94, and LA-04. Only one, Site Summit, is also listed in the National Register of Historic Places.

against far more powerful forces, Nike sites were built with planned obsolescence in mind. They used building materials designed to only slightly outlast the technology that powered these nuclear missiles. To leave these sites as mere ruins is what has happened to date, yet this has not increased public interest in the sites enough to provide a strong mandate for either preservation or demolition. Left as ruins, Nike sites also expose visitors to hazards. Rusted bunker doors leading down to

Figure 59

"This may be the only time in your life that you are asked to hold on to a nuclear weapon for safety." - John Porter, SF-88's site manager, highlighting the way safety concerns continue to influence activities on Nike sites designed for nuclear combat, as visitors prepare to ride up one of SF-88's missile magazine elevators next to an inert Nike Hercules missile. (Porter, Tour, 7 October 2005).
Courtesy of Author

generally flooded missile magazines must be dealt with safely. Towers that once held radar equipment do not generally require stabilization but must be kept off limits to climbers for safety's sake.

Often Nike sites harbor something far more difficult to deal with than deteriorated materials and obsolete technology: contamination. When Nike bases closed, the government assigned the General Services Administration to dispose of them. The National Environmental Policy Act, signed into law on January 1, 1970, requires federal agencies such as the General Services Administration to consider the effects their actions may have upon the environment. When major federal actions may significantly affect the environment, these agencies must prepare detailed environmental impact statements assessing the environmental impacts and considering alternatives that may reduce or remove those impacts. No environmental impact statements were required when ARADCOM closed Nike bases in 1974 since the General Services Administration determined the absence of machines, chemicals, and weapons on these sites would only help the environment.[26] But the removal of this equipment did not abate the environmental contamination that had already occurred at America's Nike sites.

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[26] Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 6.

Radioactive leaks pose the most significant threat, yet the hazards of radioactive materials in Hercules warheads were well known. Site personnel periodically checked for such radioactive material leaks by wiping down the Hercules missile with sensitive cloths. No documented cases of radioactive leaks occurred at Nike missile sites.[27] The majority of contamination at Nike sites stems from far more mundane practices.

A report prepared for the U.S. Army Toxic and Hazardous Materials Handling Agency Assessment Division at Aberdeen Proving Ground, Maryland indicates that standard procedures on Nike installations involved disposing of fuel, solvents, hydraulic fluid, and battery acid onsite. This resulted in the presence of some environmentally persistent compounds in the soil and groundwater on and around Nike sites to include tricholoroethylene, lead, tetrachloride, trichloroethane, and a variety of hydrocarbons. Nike site personnel routinely disposed of solvents by dumping them down sumps to be absorbed by the ground. Fuel components also followed this path, to a more limited extent, and a few reports of containerized hazardous material disposal on these sites exist. The generator building and motor pool usually included a 1-2 cubic meter pit filled with gravel used as a sump to dispose of a variety of used chemicals. Drains also carried spilled fluids from the surface of the generator area and motor pool to the sump. The intent of the sump was to provide an area to permit fluids to soak into the

[27] B.N. McMaster, et al., *Historical Overview of the Nike Missile System* (Gainesville, Florida: Environmental Science and Engineering, Inc., 1984).

ground. Some sites did have holding tanks or barrels used to store liquid waste for off-site disposal. Alternative liquid waste disposal methods included using rags to soak up spills and disposing of them in the trash (later disposed of in landfills) followed by washing the surface with water which went into the drain and then the sumps. Personnel also containerized liquid waste for off-site disposal, used hydraulic fluid for weed control around buildings, dumped waste into a soda pit, and poured waste into the latrines.[28] But such practices were by no means radical nor limited to the military at this time.

Apart from rocket fuel, civilians across the nation used most of these compounds and disposed of them in a similar manner. In addition to dumping chemicals into the ground, many compounds and practices officials considered safe then are considered harmful now. The combustion of leaded gasoline, not banned nationally until 1995, emitted lead into the air via vehicle exhaust which in turn fell to the ground, contaminating soil and water. Lead paint, not banned for use on homes in the United States until 1978, was preferred as a building coating over non-lead based paint due to its durability. Of course that durability only lasted so long, and lead paint chips produce lead-rich dust which contaminates nearby soil and water.[29] The Nike Ajax's

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[28] B.N. McMaster, et al., *Historical Overview of the Nike Missile System* (Gainesville, Florida: Environmental Science and Engineering, Inc., 1984) abstract, i, 4-4, 6-4, 6-7, 7-8.

[29] Frank J. Peryea, *Gardening on Lead- and Arsenic-Contaminated Soils*, Washington State University Bulletin EB1884 (Pullman: Washington State University, 2001) 4.

original fuel (1946 version) contained 73% potassium perchlorate.[30] Nike sites are suspected to have perchlorate contamination and low levels of this substance have been found in groundwater in at least twenty American states, though not all of this has come from Nike sites or even rocket sites in general. Perchlorate can occur naturally and is still found in manmade products besides rocket fuel such as fireworks, batteries, safety flares, airbags, and some fertilizers.[31]

The U.S. Army Corps of Engineers Formerly Used Defense Sites program is designed to clean up chemical contamination at such sites. Their efforts have been successful yet much work remains to be done. The General Services Administration has noted cleanup costs vary widely for Nike sites. Nike site HM-69 in Homestead, Florida cost $16,000 to clean up, with building demolition and debris removal accounting for the cost. Nike site C-47 in Wheeler, Indiana held containerized hazardous, toxic and radioactive wastes of a medium risk and required building demolition and debris removal. Cleanup began in 1989 and continued into 2000, costing $1,122,000.[32]

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[30] Mary T. Cagle, *Nike Ajax Historical Monograph: Development, Production, and Deployment of the Nike Ajax Weapon System 1945-1959* (Redstone Arsenal, Alabama: US Army Ordnance Missile Command, 1959) 31.

[31] California Department of Toxic Substances Control, "Perchlorate," [http://www.dtsc.ca.gov/hazardouswaste/perchlorate/], accessed 12 June 2008.

[32] United States General Accounting Office, "ENVIRONMENTAL CONTAMINATION: Cleanup Actions at Formerly Used Defense Sites," August 2001, [http://www.gao.gov/gao-01-1012sp/app2.htm], accessed 27 August 2006.

Cleanups of this sort have to be done regardless of whether responsible parties intend to preserve the base in question, since preservation regulations in general do not supersede laws mandating the cleanup of hazardous waste.

Preservationists must walk a fine line. Adaptive uses of Nike sites threaten to destroy their integrity unless the new uses can use and thereby help preserve the character-defining features of Nike sites. Adapting Nike sites for use as museums entails preserving the sites or having an extremely dilapidated museum. Actual preservation of Nike sites involves great expense and maintenance. Any treatment, to include demolition, involves considerable environmental cleanup costs. Demolition may destroy animal and plant habitat. Benign neglect requires a strong commitment on the part of the community to value something that might otherwise be considered an eyesore. While the Nike system clearly represents significant Cold War history, the way communities with individual Nike sites choose to communicate that history will determine what we learn from these sites.

Even without these challenges, the long-term success of any preservation effort relies upon a strong mandate. Nike sites are lacking in that area. Until the historical significance of the Nike air defense missile system and the context of the Cold War are better defined, preservation of Nike sites will remain problematic. These definitions need to be communicated by preservationists and historians to the American public, who ultimately determine the success or failure of preservation efforts through

their political and financial support. For these reasons as well as issues of integrity, agencies and communities should carefully consider their options before attempting to preserve Nike air defense missile sites. Fortunately, preservation is not the lone medium for communicating the significance of a system highly emblematic of the Cold War.

9 Communicating the Significance of the Nike Air Defense Missile System

Along a quiet country road just outside of Porter, Indiana sits a rusted industrial-looking compound bordered by a barbed wire topped chain link fence. Surrounded by farm fields and overgrown with vegetation, the site hardly looks like a property worthy of listing in the National Register of Historic Places, but Nike site C-47L was listed in the National Register less than a decade ago in much the same state. What happened?

Preservationists tried to preserve this site without ensuring the site had the historical recognition and public memory to support these efforts when times got tough, and they did. Like most Nike sites, issues of integrity and a host of preservation pitfalls hindered efforts to keep this launch site and its corresponding integrated fire control site not only preserved for future generations but even useful to the present generation, though citizens tried. The integrated fire control site currently serves as a paintball site, but this adaptive reuse does not rely upon the preservation of any buildings, structures, or objects on site. Following its initial use by the Indiana Department of Health, Education, and Welfare, the launch site served as a drivers' education facility for a number of years, but the local school district returned the site to the General Services Administration when that use

became unfeasible.[1] Even if these uses had resulted in perfectly maintained sites, neither of these uses successfully communicated the significance of Nike site C-47 or the Nike system in general. When the local nonprofit spearheading preservation efforts lost its founding member, the group evaporated, leaving C-47 a telling example of historic preservation with very limited supporting history and public memory. What remains is a publicly forgotten, deteriorating eyesore that threatens the physical well-being of visitors. It also threatens the public mandate for preservation of other historic sites. The existence of similar situations at Nike sites around the nation, poses significant challenges for those seeking to communicate the significance of the Nike air defense missile system.

This study contends that only when historic preservation and public memory of a particular subject are in balance do societies feel they have dealt appropriately with their past. Currently, there exists extremely limited public memory and historic preservation of the Nike system. While the nation seems content with this balance, this study also argues that the significance of the system warrants greater public attention. Crafting a positive balance between the public memory and preservation of Nike sites ideally consists of three approaches. First and foremost, efforts to communicate the Nike's

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[1] United States of America, Grantor, *Quitclaim Deed, Nike Site C-47*, Porter County, Indiana: Porter County Auditor, 26 June 1973, C-47 File, Chicago: General Services Administration, 1; Anjanette U. Sivilich, "Wheeler/Portage Nike Missile Launch Site C-47: Historic Structure Report" (Thesis, Ball State University, Indiana, 2000) 90.

significance should be grounded in a variety of interpretive methods that firmly place the Nike system within the complex, contradictory context of the Cold War. In such a context, the Nike truly becomes a quintessential Cold War site, able to effectively communicate numerous Cold War complexities. Second, preservation activities should be highly focused. Specifically, the federal government should fully commit to restoring, preserving, and interpreting Nike site SF-88 or another representative site. Finally, the federal government should create and maintain a nationwide series of markers identifying former Nike sites and briefly explaining their significance.

In the post-Cold War edition of his book *The Long Peace: Inquiries into the History of the Cold War*, historian John Lewis Gaddis predicts historians will increasingly interpret the Cold War as an era of peace and stability. Almost immediately after the attacks on September 11, 2001, the American public began doing just that, waxing sentimentally about the relative simplicity of the pre 9-11 world.[2] Yet the Cold War era is far more complex, even contradictory. Peace between the Soviet Union and United States lasted throughout the Cold war thanks in part to violent proxy wars and the ever present threat of nuclear holocaust. Military forces ballooned, but these forces departed sharply from traditional notions of military force, making them

[2] An excellent example of this is an interview with a resident of St. Charles, Missouri by National Public Radio correspondent Nina Totenberg broadcast on *Morning Edition* on March 14, 2003. In the interview on her feelings regarding terrorism and impending military action in Iraq, this woman spoke of the peace and security she knew growing up, believing her children would never know such peace given the current world situation.

less recognizable. Increasing secrecy and security helped make these larger forces less visible yet ever present in and around American communities. The Cold War is full of contradictions that American history and public memory have smoothly embraced, much like the contradictions Americans embraced when they welcomed Nike air defense missile bases into their communities. Indeed, Nike sites are highly emblematic of this contradictory conflict.

Nike sites simultaneously represent the horror of nuclear weapons and the last viable national defense against air-deliverable nuclear weapons in the United States. Nike sites were defensive and therefore provided a measure of security, yet these sites also evoked the fear of attack at any moment, which all Americans experienced during the Cold War. Nike sites provide physical evidence that the nation was willing to go so far as to include a poison weapon in its midst to ward off the greater of two evils. Nike sites are quintessential Cold War sites, and interpretation of these sites can be used to elicit the many contradictory aspects of the Cold War.

Nike sites help explain how the Cold War occupied a liminal space between war and peace. The Cold War is typified as an ideologically driven standoff between two superpowers, one of which could not even muster the ideological will to remain a nation. Given these circumstances, the question of when and how the Cold War was won remains difficult to discern, in much the same way it is difficult to determine the effectiveness, and the historical

significance derived from that effectiveness, of the Nike system. The Cold War is characterized as a "cold" war devoid of direct combat, therefore constant readiness for war without firing a shot could be said to be historically significant, if it were not for the significance already assigned to the "hot" proxy wars that sprang up around the world during this period. But, if it were not for the Nike's contribution to the defensive posture of the United States, the Cold War may have indeed become quite hot. How hot remains unknown.[3] The issue of nuclear strategy and the threat of extinguishing human life on the planet generated much speculation about the effects of nuclear war. Nike sites are emblematic of that speculation. Military officials and politicians questioned the effectiveness of the Nike air defense missile system throughout its life. Thankfully, the system itself was never actually tested in combat, yet it existed throughout the United States for roughly twenty years.

Some have questioned the successfulness of a military system that was never used in combat, but the absence of open combat is the most fundamental characteristic of the Cold War. The Cold War is characterized by possession of, not use of, nuclear weapons, therefore possession of, not use of, Nike sites reflects the spirit of the times. Can military sites that never experienced combat be considered significant? Nike sites should be. Thanks

[3] It is also interesting to consider the term "hot," used to euphemistically indicate the presence of radiation, in light of the nuclear standoff that characterized the Cold War.

to the Nike and America's other Cold War air defenses, America's defensive posture worked so well that war was *avoided*. This, in many ways, is more significant than war would have been, given the hostile, heavily armed ideological warfare taking place between the United States and Soviet Union. In his provocative 1960 study, *On Nuclear War*, Herman Kahn predicted the United States would not reach the year 2000 without a nuclear cataclysm if the nation did not spend more time trying to solve the problem of nuclear war, and yet the nation did not.[4] Writings studying nuclear strategy peaked after the Cuban Missile Crisis and then dwindled to 25% of that level by the end of the decade.[5] America's Nike air defense missile system deserves some credit for maintaining the peace during a time when a viable defense to air-deliverable nuclear weapons existed. Additionally, the armed vigilance of the Nike network typifies this "cold" standoff constantly on the brink of a shooting war. The Nike system did deter the Soviet Union from attacking the United States, as defenses in general do, but it

Figure 60

"The most valid reason of all for our pride is the fact that we never had to fire in anger the weapons we devoted ourselves to perfecting."

– Lieutenant General Raymond Shoemaker, ARADCOM commander, addressing soldiers at the ceremony deactivating the San Francisco Defense Area, May 1974.

[4] Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960) x.

[5] Spencer Weart, *Nuclear Fear: A History of Images* (Cambridge, Massachusetts: Harvard University Press, 1988) 262.

also provided something besides overwhelming offensive firepower to protect the nation.

Another contradictory place occupied by the Nike air defense missile system consists of the American response to the Soviet threat. The deployment of medium- and long-range Soviet bombers provided a strong impetus for the initial deployment of Nike air defense missile sites during the early 1950s. Soviet expenditures on intercontinental range weapons, specifically ICBMs, increased drastically during the late 1950s and throughout the 1960s, but their basic complement of long range bombers changed very little. When America's last Nike missile base closed in 1979, the Soviets still had only two hundred long-range bombers. The bomber threat to the United States remained the same, but the American perception of that threat changed radically.[6]

As defense expenditures increased and the Army developed its Nike air defenses, America's Cold War military seemed to become less effective, and the nation appeared even less safe. Military planners asked American citizens to help provide air defense against atomic weapons by volunteering in the Ground Observer Corps. They also asked Americans to support anticommunist military efforts far overseas; tacitly approve massive defense outlays; and accepting missile, fighter-interceptor, and radar installations in

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[6] Kenneth Schaffel, *The Emerging Shield: The Air Force and the Evolution of Continental Air Defense, 1945-1960* (Washington: Office of Air Force History, 1991) 267-268.

their communities. Planners told these volunteers it was only a matter of time before the nation would be secure, but that their help was needed temporarily. Yet when ARADCOM dissolved, America appeared less secure than it was in 1950.

These dichotomies fit the Cold War perfectly. The federal government had not proven to be the most prescient or reliable in terms of defense policies in general. The Soviet Union and China, which the U.S. government heavily aided during World War II, suddenly became America's arch-enemies. In turn, the United States spent amazing amounts of time and money rebuilding the two principle countries it sought to destroy during World War II: Germany and Japan. The Second Red Scare, driven by federal fears of communist subversion, ended in disgrace, while Soviet spies gained information easily through laws designed to ensure freedom of the press and fair governmental practices. The bomber and missile gaps proved to be motivated by partisan politics rather than valid threats. Dramatic increases in American military technology during the 1950s could not bring success in either Korea or Vietnam. In yet another bizarre turn of events the American government managed to convince the American public that, after years of promoting air defense, the way to make the nation safer from nuclear war was to close air defense bases and produce more offensive nuclear weapons. Air defense installations became targets unable to protect even themselves, much less civilian populations. A number of historians have concluded that

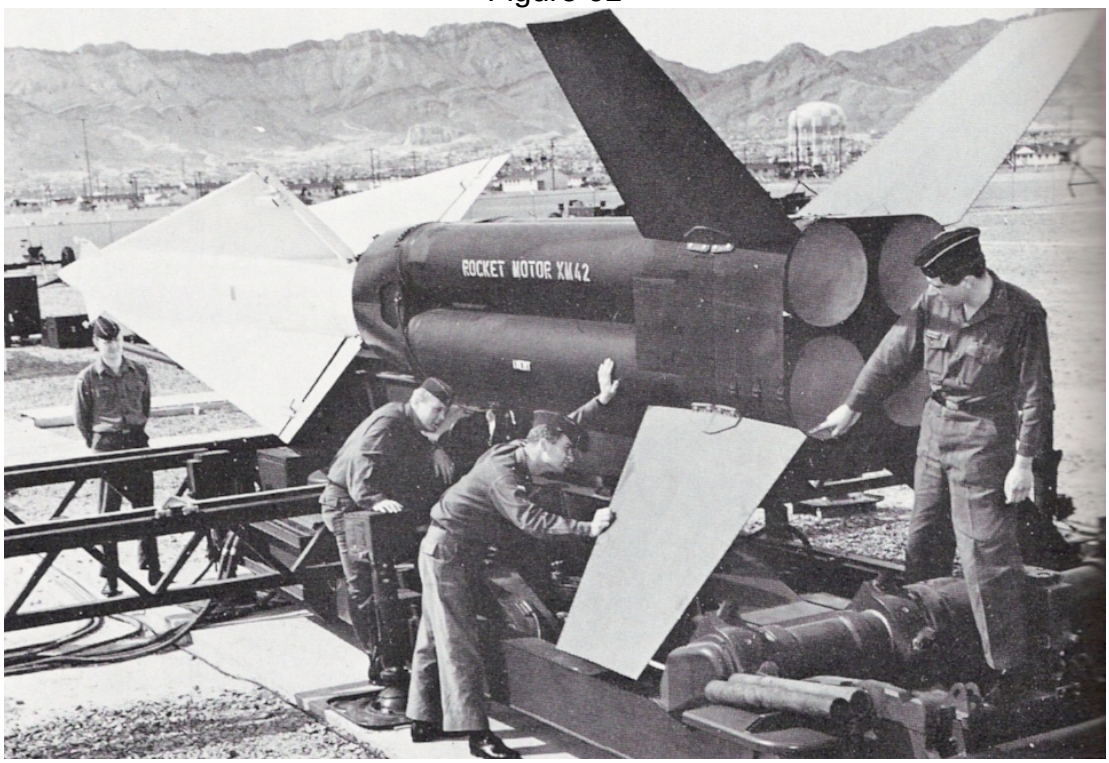
the United States won the Cold War by outspending the Soviet Union. Extreme defense expenditures seem to be the one constant in this contradictory conflict.

Conflict lies at the very root of the Cold War, yet the Cold War is a conflict that prompted tremendous cooperation between the United States and foreign nations. Indeed, this conflict prompted so much cooperation on the part of the United States that the nation's leaders and public alike seemed to forget the nation's historical reliance upon isolationism. The United States actually fostered "entangling alliances" throughout the world. The Nike program highlights those alliances through not only international defense networks like NORAD and Nike sites in NATO nations, but also through the nation's training and equipment programs for allied military forces. Far from the usual stereotype of American soldiers on foreign soil during the Cold War, the Nike program brought a degree of reciprocity seldom recognized by historians. Foreign soldiers, including troops from Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, and Turkey, learned how to operate the Nike system at Ft Bliss, Texas. These soldiers shared all facilities with American troops and spent nearly a year there completing their training. Korea and Japan also received Nike missiles.[7] On July 8, 1966, West Germany began running its own Nike Hercules and HAWK

[7] United States Army Air Defense Command, *ARADCOM Argus* (February 1963) 9.

school at Fort Bliss, Texas.[8] By the end of 1976 twenty thousand German troops had attended this school.[9]

Figure 61



West German troops examining a Hercules missile at Fort Bliss, Texas. ARADCOM's Nike training facilities proved so popular that they reversed a common Cold War theme. Many different nations stationed their soldiers in the United States at Fort Bliss, Texas while training on the Nike system. *Courtesy of U.S. Army*

The history of peacekeeping and alliances following World War II is another contradictory Cold War episode highlighted by the history of the Nike

[8] United States Army Air Defense Command, "West German School Located at Fort Bliss," *ARADCOM Argus* (May 1968) 6.

[9] "W. German Base in U.S.: A Low Profile," *Los Angeles Times*, 21 November 1976, 1.

system. America abandoned its traditional policy of isolationism in favor of the collective security offered by the United Nations (UN) following World War II. Still, America did not embrace the UN enough to give control of its nuclear weapons to that organization. Yet the American government proved more than willing to share short-range offensive and defensive nuclear missile technology. This went far beyond deploying American military forces with Nike Hercules air defense missiles to NORAD and NATO member nations. The United States government went so far as to transfer Nike air defense missile systems to West Germany, Japan, Norway, Taiwan, South Korea, Spain, Turkey, Greece, the Netherlands, Belgium, France, Italy and Denmark, at least some of which reportedly received nuclear Hercules missiles.[10]

This technology sharing illustrates the contradictory nature of security during the Cold War. The Cold War may have included top-secret projects on hidden bases, but it also included a necessary push to win the hearts and minds of people around the world, including American citizens, in an ideologically-driven war. While espionage remained an issue during this period, secrecy is simply problematic in a democratic republic with freedom of

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[10] Robert W. Leonard, ARADCOM Information Officer, Ent Air Force Base, Colorado, "Memorandum to: HQDA Washington, 'Proposed ARADCOM Reorganization Public Affairs Guidance Plan,'" 29 November 1973, in Headquarters, United States Army Air Defense Command, *Case Study, ARADCOM CONUS Air Defense Reductions: Information Aspects of the Inactivation of a Major Army Command,* Vol. I (Ent Air Force Base, Colorado: Headquarters, United States Army Air Defense Command, 1974), U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, 18; "U.S. Delaying Removal of Warheads," *New York Times*, 24 July 1975, 2.

the press, regardless of the political climate. Although the Army did place security restrictions on Nike sites, such as limitations on who could enter the missile launch area where nuclear warheads were stored, these Nike sites remained far from secret.

When the Department of Defense deactivated the Nike system, they abandoned the concept of national defense against nuclear weapons, and embraced deterrence instead. No arms reduction treaty mandated the deactivation of the Nike system. The Nike symbolizes the nation's strategic shift from defense to deterrence, and public acceptance of this shift. Peace-minded Americans embraced defense and, when cued by their military and political leaders, embraced the threat of a world-ending conflict to ensure peace. Both were considered rational strategies in this conflict that John Lewis Gaddis tellingly titled "the long peace." The Nike's demise is also an economic indicator of the toll of the Cold War, as massive expenditures in overseas "hot" proxy wars made research, development, and maintenance of air defense systems unfeasible.

Nike sites aptly depict the environmental toll of America's nuclear program. The only live fire of a Hercules missile with an armed nuclear warhead became the last atmospheric nuclear test in the United States.[11] The treaty that followed in 1963 halted all nuclear weapons testing in the atmosphere, under water, and in outer space regardless of whether the tests

[11] James Gibson, *The History of the U.S. Nuclear Arsenal* (Greenwich, Connecticut: Brompton Books Corp., 1989) 172-174.

were low-yield nuclear tests for defensive weapons like Hercules missiles. Leaders of the most powerful nations in the world acknowledged that nuclear weapons exacted such a terrible environmental toll that their testing in the atmosphere should be banned, even defensive tests. Nike sites continue to depict the environmental toll of America's nuclear weapons program. The rapid deterioration of buildings, structures, and objects on extant Nike sites and the cleanup efforts managed by the Formerly Used Defense Sites program demonstrate the damage done by nuclear weapons designed to protect the nation.

This fragility common to Nike sites also aptly demonstrates perhaps the most bizarre Cold War characteristic: the fragility of nuclear weapons. Despite being the most powerful weapons ever invented against which no feasible defense could be found, nuclear weapons remain terribly fragile. Like most nuclear weapons, Nike Hercules missiles were delicate, requiring high-tech storage facilities and regular maintenance. In the missile assembly building on each Nike site soldiers attached each missile's warhead to its booster, surrounded by protective earthen berms designed to direct accidental explosions up, rather than out. These berms indicate the precautions taken to prevent these weapons from exploding during a procedure as mundane as simply assembling the missile's warhead to its

rocket body.[12] The Nike missile system was so sensitive to temperature that engineers developed blankets and paint to keep the missile at its optimum firing temperature of 70 to 130 degrees Fahrenheit. In cool weather, a thermostat on the side of the missile automatically controlled the flow of electricity (for heat) into the missile when it was plugged in down in the magazine, and a thermostatic blanket helped retain that heat.[13] Camouflage paint, which would have helped conceal America's primary nuclear air defenses, caused the Nike Hercules missile to absorb so much solar radiation that the guidance system nearly overheated while sitting still on the ground. To prevent the missile from being rendered inoperative before it even left the ground, the Army applied its own sunscreen: white paint, designed to deflect the suns rays and reduce heat absorption.[14] The image of a nuclear missile needing a blanket to stay warm and paint the color of sunscreen to protect it from the suns rays clearly and comically depicts one of the bizarre realities of the Cold War.

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[12] Anjanette U. Sivilich, "Wheeler/Portage Nike Missile Launch Site C-47: Historic Structure Report" (Thesis, Ball State University, Indiana, 2000) 10.

[13] Terry Abel, Interview by John Martini, 7 June 1992, Interview GOGA-18811, transcript, Golden Gate National Recreation Area Park Archives, San Francisco, California, 26.

[14] R.G. Simpson and C.M. Thompson [Bell Telephone Laboratories, Inc.], *Final Report, Engineering Services Memorandum Battalion-51: Investigation of the Effect of Missile Camouflage Paint on the Operation of the NIKE-HERCULES Guidance Set*, No date, In "Camouflage (concentration: oversized files; miscellaneous)" box, Office of History, Fort Monmouth, New Jersey, 1.

Nike sites are paradoxical spaces, like so many Cold War spaces. They were publicly owned yet restricted; designed to guard urban centers yet the Army preferred to locate them in rural areas where land was cheap; secret (in at least few ways) yet well publicized to ensure community support for the sites; dangerous (explosive and sure to draw enemy fire) yet protective. In one sense, the federal government's creation of America's early Cold War air defenses stands as a strong example of centralized control of nuclear defense, in stark contrast to its "do it yourself" approach to civil defense. In another sense Nike sites represent a dramatic democratization of defense, specifically when Army National Guard personnel and civilian technicians were assigned to guard their own communities with defensive nuclear weapons. Then again, the delegation of nuclear authority from a civilian president to a military unit where a variety of commanders might have the authority to launch nuclear weapons produced decidedly mixed results for democracy.

The Cold War is the only context in which preservationists may consider the significance of Nike sites, but it is definitely the best context for ensuring preservation success. Considering Nike sites to be traditional military defensive fortifications like coastal artillery sites is probably the most popular context for Nike missile sites outside of the Cold War. Perhaps the best example of this comes from the staff and volunteers at Fort MacArthur Military Museum in San Pedro, California. Through tours and exhibits

museum personnel link Nike bases with coastal artillery positions and forts designed to provide homeland defense to the nation over centuries. While this context is thought provoking, it detracts from efforts to preserve the Nike system in several ways, and should be avoided.

Linking Nike sites to coastal defenses may hinder Nike preservation efforts. Coastal artillery sites abound in the Golden Gate National Recreation Area just outside of San Francisco, yet few preservation efforts have occurred on these sites, despite being owned for the most part by the National Park Service. Benign neglect may be an appropriate treatment for massive concrete and steel gun emplacements, but Nike sites have to contend with impermanence issues common to most post World War II construction, such as contamination, the presence of sensitive technology, and the rapid breakdown of building materials. This rapid breakdown threatens the preservation of Nike sites, for historic sites communicate their significance through the integrity of their physical remnants.

Additionally, Nike sites are far less attractive than conventional seaside fortifications, and therefore more of a potential liability for communities seeking to preserve their past. They generally do not offer beautiful ocean views, are not always located in coastal areas where tourism already exists, and were never engineered to withstand a single bombardment much less years of no maintenance. Even with nice ocean views and being close to other preserved military sites, Nike site LA-43, which the Fort MacArthur

Museum successfully nominated to the California Register of Historical Resources and which the museum was trying to preserve, is slated for demolition by the City of Los Angeles.[15]

Finally, coastal artillery sites that did not engage in combat are generally less historically significant than Nike sites. Coastal artillery sites came and went as presidential administrations favored coastal defense more or less. While any artillery position is some form of deterrent to attacking a nation, geography did far more to protect the United States than any defensive artillery position. Until the beginning of the Cold War, when long-range aircraft proved their ability to attack the United States with little to no warning, the United States was protected by the vast expanses of the Atlantic and Pacific Oceans, formidable obstacles for any attacking force. Furthermore, conventional coastal artillery defended the nation against ships with conventional armaments. If the artillery position proved unable to destroy the ship before it successfully struck a target with a shell, all was not lost. Nike air defense missile sites had far less room for error. One successful detonation of an atomic bomb over a city defended by Nike missile sites left little for the Nike site to defend, if the site was not obliterated in the massive explosion.

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[15] Fort MacArthur Museum Association, "Preservation Projects at Whites Point," [http://www.ftmac.org/WhitesPoint.htm] accessed 22 August 2008.

Nike bases are truly quintessential Cold War sites, when one considers the contradictory complexities of this conflict. Thoughtful interpretation of Nike sites as emblems of a war of contradictions is the best way to communicate their significance. Far more than any preservation effort, the interpretation of Nike sites is what will determine their longevity in public memory and history.

Given their significance, some form of preservation is definitely in order, but, since issues of integrity and numerous preservation pitfalls pose serious challenges, Nike site preservation should be highly focused. Specifically, the federal government should commit itself to restoring, preserving, and interpreting one representative Nike site in a manner equal to or greater than its efforts to restore a Titan missile site in Arizona and one Minuteman missile site in South Dakota. Nuclear missiles in general are extremely expensive, require very rare radioactive materials to operate, and require highly skilled labor to develop and maintain them. The difficulty inherent in developing and maintaining these immensely powerful yet fragile weapons is akin to the difficulty inherent in preserving such powerful yet fragile Nike air defense missile sites.

Like most Cold War defense sites, Nike sites, for the most part, sit in between redevelopment and historic preservation. Many are left but few have been preserved. Although defunct Nike sites exist throughout the United States, local actors are not equipped to restore and preserve Nike sites.

Local organizations in general lack the funding, staff, restoration expertise, tacit knowledge of site operations, technical knowledge of Nike site equipment, and public mandate to preserve Nike sites. C-47 in Wheeler, Indiana is a telling example.

On September 23,1999 the General Services Administration Regional Historic Preservation Officer, Regina Nally, visited C-47L in Wheeler, Indiana to evaluate the site's condition and potential eligibility for listing in the National Register of Historic Places, as requested by the Keeper of the National Register. Her written estimate of the site's condition is not encouraging. Even the fallout building, constructed of massive, sixteen inch thick concrete walls and nine ton metal doors, has a failed roof, deteriorated and inoperable doors, severe water infiltration, and demolished interior finishes. Other buildings and structures are described in a similar manner. "Severely rusted,"' "failed," "inoperative," completely deteriorated," "open to the elements" and "most likely irreparable," are terms that crop up frequently as she describes the site. The roofs of many buildings have gaping holes in them. Water fills up all of the missile magazines to within a few feet of the surface. Somehow, this Regional Historic Preservation Officer walked away from this site supporting its listing in the National Register of Historic Places.[16]

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[16] Anjanette U. Sivilich, "Wheeler/Portage Nike Missile Launch Site C-47: Historic Structure Report" (Thesis, Ball State University, Indiana, 2000) 10; Regina Nally, Property Inspection Report: Nike Missile Site C-47 (Real

The condition of C-47's integrated fire control site is roughly equivalent. Few buildings on the integrated fire control site retain their doors or windows and many holes have been knocked through building walls for paintball portholes. Lots of things have been added to the IFC site: picnic tables, prefabricated buildings, areas fenced off by netting held up by telephone poles, obstacles/cover for paintball players, and paintball pellet marks everywhere. Still, the true owner of both sites now appears to be nature. Apart from the rare moments when paintball battles rage, both of these former military sites are extremely peaceful. Crickets chirp. The wind blows the leaves in trees underneath a wide sky. Beautiful fields hem the sites. Cars and trains whisper off in the distance. Birds sing from nests inside buildings on the integrated fire control site. Birds of prey use radar tower frames for a hunting perch. Both sites have apple trees.

Yet this pleasant base managed to shatter a local nonprofit preservation group. Initial enthusiasm to preserve the installation caused one area resident to form a nonprofit organization, the Nike Preservation Group (NPG), in 1998. Following the listing of the property in the National Register of Historic Places and the sudden death of the organization's founder, the organization melted away, leaving Nike site C-47 nearly as forgotten and deteriorating as it had been prior to the group's involvement. Former group

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Property Disposal), GSA, Public Building Service - Historic Preservation Program, Great Lakes Region (5), 23 September 1999, C-47 File, Chicago: General Services Administration, 1-2.

Figure 62

Nature appears to have taken Nike site C-47C by force. Open spaces between buildings and structures are presently (above) overgrown with vegetation where once (below) only scant vegetation existed.
Courtesy of Author and U.S. Army

officials will not return e-mail and telephone inquiries.[17]

This scene is a far cry from SF-88, or parts of it at least. Perched on high hills in the Marin Headlands, SF-88 lies just outside of San Francisco and in the middle of what is currently a national park: the Golden Gate National Recreation Area (GGNRA). SF-88L, the launch site, has been painstakingly restored to something very near its Cold War glory, minus nuclear warheads and highly explosive rocket fuels. But it was not always this way. Next to nothing was done to preserve the site, despite a preservation directive given to the National Park Service back when the Golden Gate National Recreation Area was formed in the early 1970s.[18] Tremendous efforts from volunteers and the tireless work of several National Park Service staff members have brought about most of the launch site's success. While tourists of all sorts flock to the site, little funding does.

A National Park Service (NPS) website touts a partnership with volunteers that hardly seems sustainable. In 2004, the National Park Service

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[17] Nike Preservation Group newsletters available online begin in October 1998 and end in October 2001. Site C-47 remains in the hands of the General Services Administration, awaiting disposal. [Nike Preservation Group, *The NPG News: The Newsletter of the Nike Preservation Group* 1 (October 1998), [http://ed-thelen.org/npg-newsletters.html], accessed 10 April 2006; Nike Preservation Group, *The NPG News: The Newsletter of the Nike Preservation Group* 3 (May 2000), [http://ed-thelen.org/npg-newsletters.html], accessed 10 April 2006.]

[18] Fran M. Roberts, Chief, Real Estate Branch, "Memorandum for the Record, 25 February 1974, Operation Concise/Outline of Real Estate Actions, Presidio of San Francisco," Folder "BBC-Excessing the Nike Site SF-88: 3 July 1974," Box 4, Army Text Files, APWEMR-4, Golden Gate National Recreation Area Park Archives, San Francisco, California, 1-2.

began allocating $50,000 annually to site restoration efforts, but these allocations sunset in 2011. Even with this funding, volunteers provide the lion's share of restoration expertise and effort. The National Park Service website highlighting this partnership notes volunteers provide engineering and interpretive expertise while government funds cover the cost of paving and fencing for the site. While paving and fencing are certainly historic characteristics of Nike sites, they are also required for basic security and maintenance on most historic sites in general.[19] Documentation regarding funding of these restoration efforts prior to 2004 is not posted, but the National Park Service has, at times, allocated money to more technical efforts, such as the publication of an interim history and preservation plan for the site.[20]

Additionally, the National Park Service has virtually ignored one third of SF-88: the integrated fire control site. Hikers can climb Wolf Ridge overlooking the launch site to reach the integrated fire control site assigned to SF-88. This site lies vacant and vandalized with no indication of its original use save a dot on a trail map and a brief mention in a few faded placards far

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[19] It is unclear from this website whether this $50,000 annual budget item covers the salary of the site's lone park ranger. [National Park Service, *Partnerships: Fort Barry Nike Site SF-88 Volunteers,* [http://www.nps.gov/ partnerships/ fort_barry_nike_site.htm], accessed 31 August 2008.]

[20] Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part I* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 68.

below in the valley.[21] While SF-88 may be the best restored Nike air defense missile site in the United States and the only site regularly open for public tours, a commitment to focused preservation of the site requires more from the federal government. Such a commitment is certainly warranted. A 2003 review of the site notes that it attracts twenty-thousand visitors annually: an average of over one-hundred people per day at a site open a for a few hours per day roughly 170 days of the year.[22]

Beyond funding and technical challenges, maintaining a public mandate to preserve is a crucial component of preservation not considered by the National Register nomination process and most other historic designation processes at the state and local level. Key to maintaining a public mandate to preserve is instilling a sense of pride in, and ownership of, local historic sites among local community members.

Narratives about Nike sites will have to change to better incorporate Nike sites into the history of local communities before local preservationists can hope to maintain the mandate to preserve these complex sites. National Register nomination forms tend to treat Nike sites as self-contained bases, assigning little agency to actors in surrounding communities but American

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[21] SF-88's administrative site stands between these two extremes. Adaptively reused buildings there house a YMCA camp.

[22] National Park Service, *Partnerships: Fort Barry Nike Site SF-88 Volunteers,* [http://www.nps.gov/partnerships/ fort_barry_nike_site.htm], accessed 31 August 2008; Golden Gate National Recreation Area, *Nike Missile Site*, [http://www.nps.gov/goga/nike-missile-site.htm], accessed 17 May 2008.

citizens had a surprising degree of input into the shape of these defenses, as discussed in chapter two. Nike sites alone existed in over one-half of all states, yet these sites had roughly 125 personnel each.[23] In such circumstances, the military is not some faceless megalith. The military becomes a series of personal contacts local townsfolk have with soldiers living in and defending their community. The size of such bases and their relative isolation from larger bases made them far more dependent upon the local economy for procurement of necessary supplies, and thus America's Nike air defense missile bases in some ways had a greater economic impact per soldier than larger bases. But with symbolic and physical ownership of these sites still lying with the federal government, if anyone, few Americans know the history or significance of Nike bases lying in and around their community.

It is understandable that the remains of Nike sites have lost their associations with the military. While a number of these Nike sites had been associated with military activities in years prior to their activation, the end of

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[23] Authorized strengths fluctuated on Nike bases as equipment changed. Actual strengths rose and fell as personnel demands and recruiting fluctuated. In general, 125 seems to be an average personnel level for Nike sites during their active military life. [Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189; John C. Lonnquest and David F. Winkler, *To Defend and Deter: The Legacy of the United States Cold War Missile Program* (Rock Island, Illinois: Defense Publishing Service, 1996) 451-582; and Christine Whitacre, ed. *Last Line of Defense: Nike Missile Sites in Illinois* (Barrington, Illinois: U.S. Army Corps of Engineers, Chicago District, 1996) 31].

ARADCOM and closing of these sites in general signaled the end of a military presence at the vast majority of these sites. Many Nike sites were located on former coastal artillery sites for which the American military had little use after Nike sites departed. Others were located on relatively small parcels of land, far removed from larger military bases whose staff could find new, feasible uses for the land. The sites which best maintained their connection to the Cold War military after Nike sites left, those sites at Strategic Air Command bases, ironically had the shortest life as Nike sites.[24]

Even among federal officials, Nike sites' connection to the Army is frequently unclear. The parent unit of Nike sites, ARADCOM, dissolved in 1975. The Department of Defense transferred the remaining Nike sites to the General Services Administration for disposal, but that is not always apparent. Efforts to nominate Nike site C-47 in Wheeler, Indiana became complicated by difficulties determining who owned the Nike site, though eventually it was determined the site was owned by the Property Disposal Division of the General Services Administration.[25] Other segments of the federal government demonstrate a similar unwillingness to take responsibility for the legacy of Nike sites, specifically when taking responsibility for declassifying ARADCOM records, as discussed in chapter eight.

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[24] Mark Morgan and Mark Berhow, *Rings of Supersonic Steel: The Air Defenses of the United States Army 1950-1979* (San Pedro, California: Fort MacArthur Military Press, 2002) 43-189.

[25] Anjanette U. Sivilich, "Wheeler/Portage Nike Missile Launch Site C-47: Historic Structure Report" (Thesis, Ball State University, Indiana, 2000) 15.

As far as making a memorable impact, Nike sites certainly affected local communities, but not in ways generally regarded by members of the public as being historically significant. Nike sites, for the most part, had no role in a single, finite, historically significant event, such as a battle. They are generally not associated with significant people in the histories of American communities, states, or the nation. Additionally, they have no particular architectural merits that make them desirable landmarks to local communities. Finally, their potential to reveal data of use to local communities is extremely limited. These four basic significance criteria of the National Register of Historic Places (events, people, architecture, and data) are not the only historical significance criterion employed by local communities, but most communities tend to use some variation of this nationally recognized standard.

Nike sites are significant, however, and the Nike system can be used to communicate the complexities of the Cold War. Making this connection does not simply mean writing stronger significance statements on forms used to nominate historic properties for designation. Beyond rewriting Cold War histories, preservationists must find ways to link individual memories of Nike sites to a broader public memory of the Cold War.

Michael Kenny's article "A Place for Memory: The Interface Between Individual and Collective History" focuses on how individual memories become collective memory. Memory needs a context. Public memory

changes as times change because societal consciousness and political views of the past change. These changes provide a collective place for individual memories. Kenny uses as an example the widespread public acknowledgement that boarding schools for Native Americans was wrong. Suddenly private memories of humiliation had a place within the public memory of a society trying to deal with its complicity in these organizations. Scholars stopped focusing on cultural disintegration and assimilation when writing about Native experiences in boarding schools and began focusing on cultural resurgence and resistance.[26] Memories of America's Nike bases have no real place in public memory and will not until events highlight their importance once again, such as after a successful nuclear strike against the United States, or until society is able to find some meaning in their former existence.

While historians can highlight topics in ways likely to make memories meaningful, such as through a recontextualization of the Cold War, they alone cannot suddenly "create" public memory. In his study of public memory titled *These Honored Dead: How the Story of Gettysburg Shaped American Memory,* Thomas Desjardin notes that people create mythology from the past, genuinely wanting to believe certain things about history that reflect their values. Tragic, romantic, exciting stories win out over less thrilling tales in

[26] Michael G. Kenny, "A Place for Memory: The Interface Between Individual and Collective History," *Comparative Studies in Society and History*, 41 (July 1999): 431.

private and public memory.[27] The fact that Cold War air defense has no significant trauma or secrecy makes it less popular than other Cold War topics with strong showings in these categories: Roswell; Area 52; the JFK assassination; the trial of Julius and Ethel Rosenberg; and hidden nuclear war command posts. Furthermore, the nation reluctantly abandoned air defense and accepted deterrence and a costly arms race as the lesser of two evils. In no way did this bring victory or even end the Cold War, which dragged on for nearly another two decades following the deactivation of ARADCOM.

Desjardin also notes that many of what are considered the most authentic accounts of Civil War battles were written by survivors of those battles, but written during a period characterized by struggles to redeem personal and national reputations. These struggles shaped this literature.[28]

Few struggles to redeem reputations take place nowadays when historians craft Cold War narratives. The struggle of Korean and Vietnam veterans to receive recognition for their service dominated historical scholarship for some time, but these struggles were completely removed from the Cold War of nuclear air defenses: highly technological, located close to home, and not really associated with trauma. In fact, Cold War veterans have yet to begin fighting for the recognition that Vietnam, Korea, and World War II

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[27] Thomas A. Desjardin, *These Honored Dead: How the Story of Gettysburg Shaped American Memory* (Cambridge, Massachusetts: Da Capo Press, 2003) 39.

[28] Thomas A. Desjardin, *These Honored Dead: How the Story of Gettysburg Shaped American Memory* (Cambridge, Massachusetts: Da Capo Press, 2003) xvi, 39-40.

veterans have found in national monuments. Cold War Recognition Certificates, available to all veterans, federal employees, and active duty service members who served between September 2, 1945 and December 26, 1991, remain unclaimed for the most part. As of August 2003 only about one million of the twenty-two million eligible for the certificate have requested this recognition, roughly five years after the Secretary of Defense authorized its issuance.[29] In some ways this is not surprising. The Cold War ended without a "hot," shooting war in the United States, so service cannot be traced to meritorious service in defense of the nation, overseas proxy wars notwithstanding. While veterans indeed deserve recognition for being willing to give their lives for their country, the line between soldier and civilian became highly blurred during the Cold War. Soldiers in ARADCOM did serve on the front lines, yet never left the contiguous United States and Greenland. Thanks to the incredible range speed, and destructive power of nuclear weapons, military forces became patently unable to protect civilians. When civilians are targets, everyone becomes a Cold War veteran in a sense, which devalues these awards.

But that ubiquity and commonality may be the key to improving public memory and preservation of Nike sites. Not only were Americans all Cold War veterans, in one sense, they all had Cold War air defense bases close at

[29] Washington State Department of Veterans Affairs, "Armed Forces News," 8 Aug 2003, [http://www.dva.wa.gov/Archived%20news/archived_news_august_2003.htm], accessed 22 October 2005.

hand. Nike sites were part of a defensive network of thousands of Cold War air defense sites that collectively constituted the largest peacetime deployment of military might into the United States. Alone, these small sites made relatively little impact upon the countryside, at least compared to larger military bases, but their ubiquity is staggering.

Part of the problem with preserving Nike sites, or any common type of air defense site, is that individual sites are like pieces of an artifact dug up by an archaeologist. These fragments alone reveal details, but the fragments need to be considered as parts of a larger entity for people to truly understand what they represent. This larger entity consists of not only thousands of physical sites, but the unprecedented implicit and explicit involvement of American civilians in a nearly half-century long conflict.

One member of the House of Representatives has called for the creation of a Cold War heritage trail on Long Island, New York. He proposes the preservation and interpretation of more than a dozen sites, but he limits his recommendation to defense installations owned by the federal government. Numerous other Cold War air defense sites such as public and private fallout shelters; volunteer Ground Observer Corps posts and filter centers; and secondary airfields that were often co-located with civilian airports are not a part of his proposal.[30] Certainly, an extended district of preserved Cold War properties could constitute a successful preservation

[30] "Recalling Strategic Fortifications: LI Should Establish a Cold War Heritage Trail," *Newsday* (Long Island, New York) 4 January 2005, A37.

effort, but funding, organization, and distance between sites would pose sizeable obstacles to any such effort. Of course, there is no way thousands of Cold War air defense sites could or should be preserved. Apart from preserving a small number of the primary types of these sites, a nationwide system of markers can best illustrate the full extent of America's Cold War air defense network.

While communities and states can certainly pursue such a program individually, the federal government should be the driving force behind any Nike site marker program. Increasing the program to include all Cold War air defense sites is appropriate as it would dramatically increase the number of markers and accurately depict the full extent of America's defenses. To create the most powerful teaching point, the government should develop some easily recognizable theme to link all Cold War air defense site markers together. Whether it be the color, shape, or design of these markers, they should be easily identifiable from a distance, to easily impart this unprecedented infusion of defense into American communities.

The markers should contain a descriptive narrative too, enabling automobile travelers to disembark and learn more about the site they readily identified when passing at a high rate of speed. Like mail boxes, phone booths, emergency call boxes, fire hydrants, and fallout shelter signs, Cold War air defense site markers should become a readily identifiable, if less ubiquitous, feature of the American landscape to demonstrate the full extent

of America's Cold War air defense program. Inert missiles with an attached plaque would certainly be evocative, but it is unknown whether enough Nike missiles still exist to be put to such uses, and the deterioration of these missiles experienced at Guardian Park indicates such markers would be even less permanent than the sites they commemorate.

In the case of sites with multiple areas, such as the launch, administrative, and integrated fire control areas in many Nike batteries, each area should have its own marker. Ideally, one weather-resistant, vandal-resistant, theft-resistant, evocative portion of each Nike site could remain intact and serve as this marker, but the lack of common elements among Nike site administrative, launch, and integrated fire control areas as well as the demolition of some Nike sites makes this difficult. In cases of demolition, these markers could be placed on the closest piece of public property and the inscription could verbally direct readers to the actual location.

Adding a degree of functionality to the markers would speed their deployment and provide funding for these markers, initially, but brings other challenges related to association, aesthetics, and technology. For example, installing a transmission antenna on each former Nike installation with a descriptive plaque would evocatively indicate the interconnected network of air defense sites throughout the nation. Unfortunately, other transmission antennae exist outside of Nike sites, and the Nike antennae might not be associated with Nike sites amidst the clutter. Transmission antennae

generally need to be elevated to great heights. Integrated fire control sites, chosen for their geographical ability to provide clear transmission fields, would be well-endowed for such uses. But the shape and size of transmission antennae for cellular telephones, for example, is far different that that required for Nike sites. Property owners who oppose cellular transmission towers for aesthetic reasons might be joined by preservationists who oppose towers that alter the integrity of Nike sites. Additionally, the pace of technological change might quickly render any transmission function obsolete. The proliferation of cellular telephone technology, cable television, and satellite television has greatly changed the transmission antennae landscape in the United States since the end of ARADCOM over thirty years ago. At that time, telephones used cables for transmission, and televisions relied upon aerial transmission. Roof mounted television aerials and large satellite dishes have been replaced with small Dish Network television antennae and cable television lines.

Other functional marker options are also less that ideal. Each Nike site had its own well for water, but the suspected presence of perchlorate and other contaminants in the drinking water at Nike sites would make a drinking fountain style marker something just a little too indicative of one aspect of America's Cold War defense sites.[31] Each Nike site had its own generator

[31] California Department of Toxic Substances Control, "Perchlorate," [http://www.dtsc.ca.gov/hazardouswaste/perchlorate/], accessed 12 June 2008.

that could be used in emergencies, but this generator engine technology dates back to the 1950s when fuel efficiency, noise, and emissions were not major concerns. Additionally, these generators have generally been stripped from extant Nike sites, meaning some limited form of restoration would have to occur to make this functional marker system work.

Some marker templates already exist, but these are less than ideal. A few communities like St. Bonifacius, Minnesota and Riverview, Michigan have already erected markers along with inert Hercules missiles.[32] These markers reveal little about the Nike system as a whole and stand as individual monuments unlikely to be repeated at every Nike site across the United States if, for no other reason than because inert Nike Hercules missiles are not a readily available commodity. In the late 1990s the Virginia Department of Natural Resources erected markers around Virginia's Nike air defense missile sites. These markers are a uniform design utilized on all state historical markers, making the Nike sites blend in with every other historical marker in the commonwealth.[33] The Lincoln Highway, America's first coast-to-coast highway, has old concrete markers that occasionally remain in their original locations. While these markers have a unique look and serve to mark

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[32] "'D-54 - Riverview/Wyandotte, Michigan' Waymark," [http://www.waymarking.com/waymarks/WM1QW8], accessed 2 November 2008; Site visit by author to St. Bonifacius, Minnesota, March 2005.

[33] Virginia Department of Historic Resources, "Historical Highway Markers. Marking History on Virginia Roadways: The State Historical Highway Marker Program," [http://www.dhr.Virginia.gov/hiway_markers/hwmarker_article.htm], accessed 2 November 2008.

a route that has been changed so dramatically that it has lost its ability to communicate its historical significance, these markers are small, difficult to see, and contain no information to inform travelers of the national route.[34] Fallout shelter signs have survived the passage of time, are readily identifiable to passers by, and are easy to maintain, though they do not inform readers of the composition of their shelter or the larger network of fallout shelters.[35]

Of course, a series of themed markers would blur the differences between Cold War air defense sites, and there were major differences. Ground Observer Corps posts were often nothing more than a designated space on the ground with clear fields of vision manned by part-time civilian volunteers. Nike air defense missile sites presented a far different picture. While there were enough similarities among Nike sites to consider them a military franchise, they did possess physical differences, and their impact upon the communities they protected did vary.

In his book *Sense of History: The Place of the Past in American Life*, David Glassberg considers place and placelessness in American society. He acknowledges that interchangeable chain stores, with their near uniform architecture, branding, and operations, do create a sense of placelessness,

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[34] The Lincoln Highway National Museum and Archives "1913--Lincoln Highway Signs—1928," [http://www.lincolnhighwaymuseum.org /Signs/ Signs-Index.html], accessed 2 November 2008.

[35] Civil Defense Museum, "Fallout Shelter Signs," [http://www. civildefensemuseum.com/signs/index.html], accessed 2 November 2008.

since these sorts of businesses appear virtually the same throughout the nation. Yet he also acknowledges that the way people interact with those spaces is a part of how those spaces become authentic places unique to particular communities.[36] Like chain stores, Nike sites were placeless, since they often relied upon extremely similar architecture, branding, and operations, yet they were also distinct places because of their interaction with the unique communities around them. It is deceptive to purport that a series of uniform markers can somehow accurately communicate the impact of a nuclear missile base upon hundreds of communities, but such markers enable local communities to choose how they remember and interpret their Cold War air defense sites.

The sheer number of historical markers required to indicate the location of all 275 Nike sites with two to three separate areas per site, not to mention the thousands of other markers required to identify all other Cold War air defense sites, certainly communicates the alarmed importance the nation assigned to Cold War air defense. Unfortunately, it also threatens to further clutter a landscape already crowded with historical landmarks, memorials, and markers. In his article "Between Memory and History: Les Lieux de Mémoire," Pierre Nora notes how the rise of capitalism, technology, media, and international communication sacrificed *milieux de memoire*, or real environments of memory, where the gap between memory and the present

[36] David Glassberg, *Sense of History: The Place of the Past in American Life* (Amherst: University of Massachusetts Press, 2001) 111-127.

was fluid, in favor of *lieux de memoire*, or human designated sites of memory. The conscious effort of designating a site historic or placing a marker only at certain sites based upon their historical importance is precisely the creation of *lieux de memoire* that Nora deplores.[37]

Figure 63

The Virginia State Historical Highway Marker Program utilizes a template that relies upon text alone to distinguish Nike sites from other historic sites. While such a format is easily recognizable, is readily identifiable at high speeds, and provides site-specific information, it exemplifies Nora's concern with an overabundance of *lieux de memoire.* Both of these photographs are taken from an Internet database devoted to tracking and publishing images of historical markers. The images generally remove markers from the context of the sites that they mark, exacerbating the tendency to consider them nothing more than *lieux de memoire*. *Courtesy of J.J. Prats, HMdb.org*

Indeed, if the American public has seen it fit to collectively forget that nuclear air defense missile sites ever existed, who are preservationists to demand they acknowledge the error of their ways? In his book *Present*

[37] Pierre Nora, "Between Memory and History: Les Lieux de Mémoire," *Representations* 26 (Spring 1989): 7-25.

Pasts: Urban Palimpsests and the Politics of Memory Andreas Huyssen confronts the growing volume of memories and history presented to globalized societies expected to identify with an ever-increasing heritage. Huyssen expresses strong reservations with the increasing pace at which societies build sites of memory and collect records. Recently recognized areas of historical inquiry and subaltern pasts have ballooned the scope of history so much that historians are often unable to predict what sources will be truly significant to future generations. When in doubt archivists and records managers have opted to preserve everything. Huyssen even notes the boom in retro fashions and postmodern architecture and questions whether people will remember any portion of this massive amount of information once the memory boom dies. Rather than calling for an abandonment of history, historic sites, and archives, Huyssen calls for discrimination and productive remembering to ensure the future is adequately planned.[38]

The basic premise of this work is that American society has not appropriately gauged the significance of America's Cold War air defenses. Rather than demanding some expensive and difficult preservation effort, this work seeks to strike a positive balance between public memory and historic preservation of the Nike system with interpretive recontextualization, highly focused preservation, and a series of markers.

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[38] Andreas Huyssen, *Present Pasts: Urban Palimpsests and the Politics of Memory* (Stanford: Stanford University Press, 2003) 11-29.

Despite America's current preoccupation with the war in Iraq and warnings of a second Cold War with Russia, American leaders are curious about the impact of the Cold War upon American society. In January 2008 Senator Harry Reid of Nevada introduced a bill to conduct a theme study to identify sites and resources that commemorate and interpret the Cold War.[39] Hopefully, Nike sites will be considered carefully.

Preserving significant elements of the past is certainly important, but in the case of nuclear air defenses, substantial consideration must be given to feasible methods of informing future decision makers of our nation's efforts at self-preservation during the Cold War. Nuclear weapons remain the most powerful armament on the planet. No feasible defense against these weapons currently exists. It is only a matter of time before American society as a whole is forced to confront the nuclear dilemma. At that time the nation will ideally be armed with a sound understanding of the rise and fall of America's primary nuclear air defenses: the Nike air defense missile system.

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[39] U.S. Congress, Senate, Senator Harry Reid introducing a bill to require the Secretary of the Interior to conduct a theme study to identify sites and resources to commemorate and interpret the Cold War to the Committee on Energy and Natural Resources, S. 2561, 110th Cong., 2nd sess, C*ongressional Record* 154, 28 January 2008, [http://frwebgate2.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=206640176962+0+0+0&WAISaction=retrieve], accessed 31 August 2008, S396-S397.

Acronyms and Abbreviations

From the very first stages of their indoctrination, military and governmental personnel learn acronyms and abbreviations. Histories with excessive acronyms and abbreviations drive off even the most ardent historians, yet histories without them leave readers ignorant to important terminology. This appendix attempts to create a compromise between these approaches.

AADCP - Army Air Defense Command Post

ABM - anti-ballistic missile

ADA – air defense artillery

ADC - Air Defense Command

ADL – Automatic Data Link

AEC - Atomic Energy Commission

AFB - Air Force Base

AFS - Air Force Station

AR – Army Regulation

ARAACOM - Army Antiaircraft Command

ARADCOM - Army Air Defense Command

ARNG – Army National Guard

ASP - Annual Service Practice

ATBM - Antitactical Ballistic Missile

BIRDIE - Battery Integrated Radar Display Equipment

BOMARC - Boeing - Michigan Aeronautical Research Center

BOQs - bachelor officers' quarters

CONAD - Continental Air Defense Command

CONUS – Continental United States

CNN – Cable News Network

DOE – Department of Energy

FOIA – Freedom of Information Act

G3 – operations section

GGNRA - Golden Gate National Recreation Area

GSA - General Services Administration

HAWK – Homing All the Way Killer

HE – high explosive (missile warhead)

HIPAR - High Power Acquisition Radar

HQDA – Headquarters, Department of the Army

ICBM - intercontinental ballistic missile

IFC - integrated fire control (portion of each Nike site)

MAD - mutually assured destruction

MIRV - multiple independently targetable reentry vehicles

mm - millimeter

NARA - National Archives and Records Administration

NEPA - National Environmental Policy Act

NORAD - North American Air Defense Command

NPG - Nike Preservation Group

NPS - A National Park Service

NRA – National Recreation Area

OCR – optical character recognition

ORE - Operational Readiness Evaluation

POW/MIA - Prisoner of War/Missing in Action

RA – Regular Army

SAC - Strategic Air Command

SAGE - Semi-Automatic Ground Environment

SALT - Strategic Arms Limitation Treaty

SAM – Surface to Air Missile

SDI - Strategic Defense Initiative (a.k.a. Star Wars)

SLBM - submarine launched ballistic missile

TNT - trinitrotoluene

TRR – Target Ranging Radar

TTR – Target Tracking Radar

UDMH - unsymmetrical dimethyl hydrazine

UN - United Nations

USAF - United States Air Force

USARADCOM – United States Army Air Defense Command

USGS - United States Geological Survey

USS – United States Ship

WAC – Women’s Army Corps

List of Constructed Nike Air Defense Missile Sites in the United States

	STATE	NAME	DEFENSE AREA	LOCATION
1	AK	Point/ Site A (double)	Anchorage	Anchorage International Airport
2	AK	Bay/ Site C	Anchorage	Goose Bay
3	AK	Summit/ Site B	Anchorage	Chugach Mountains
4	AK	Peter	Fairbanks	Eielson AFB
5	AK	Mike	Fairbanks	Eielson AFB
6	AK	Jig	Fairbanks	Eielson AFB
7	AK	Tare	Fairbanks	Newman
8	AK	Love	Fairbanks	Fairbanks
9	CA	LA-04	Los Angeles	Mt. Gleason / Palmdale
10	CA	LA-09	Los Angeles	Mt. Disappointment / Barley Flats
11	CA	LA-14	Los Angeles	South El Monte
12	CA	LA-29	Los Angeles	Brea / Puente Hills
13	CA	LA-32	Los Angeles	Garden Grove
14	CA	LA-40	Los Angeles	Long Beach Airport / Lakewood
15	CA	LA-43	Los Angeles	Ft. MacArthur (Upper Res. / Whites Point)
16	CA	LA-55	Los Angeles	Point Vicente
17	CA	LA-57	Los Angeles	Redondo Beach / Torrance
18	CA	LA-70	Los Angeles	Hyperion / Playa Del Rey
19	CA	LA-73	Los Angeles	Playa Del Rey / Los Angeles Int. Airport
20	CA	LA-78	Los Angeles	Malibu
21	CA	LA-88	Los Angeles	Chatsworth / Oat Mountain
22	CA	LA-94	Los Angeles	Los Pinetos / Newhall
23	CA	LA-96	Los Angeles	Van Nuys / Sepulveda
24	CA	LA-98	Los Angeles	Magic Mountain / Lang / Saugus
25	CA	SF-08	San Francisco	San Pablo Ridge

	STATE	NAME	DEFENSE AREA	LOCATION
26	CA	SF-09	San Francisco	San Pablo Ridge / Berkeley
27	CA	SF-25	San Francisco	Rocky Ridge
28	CA	SF-31	San Francisco	Lake Chabot / Castro Valley
29	CA	SF-37	San Francisco	Coyote Hills / Newark
30	CA	SF-51	San Francisco	Milagra / Pacifica
31	CA	SF-59	San Francisco	Ft. Funston / Mt. San Bruno
32	CA	SF-87	San Francisco	Ft. Cronkhite / Sausalito
33	CA	SF-88	San Francisco	Ft. Barry / Sausalito
34	CA	SF-89	San Francisco	Presidio of San Francisco / Mt. Sutro
35	CA	SF-91	San Francisco	Angel Island
36	CA	SF-93	San Francisco	San Rafael
37	CA	T-10	Travis	Elmira
38	CA	T-33	Travis	Dixon / Lambie
39	CA	T-53	Travis	Potrero Hills
40	CA	T-86	Travis	Fairfield / Cement Hills
41	CT	BR-04	Bridgeport	Ansonia
42	CT	BR-15	Bridgeport	West Haven
43	CT	BR-17	Bridgeport	Milford
44	CT	BR-65	Bridgeport	Fairfield
45	CT	BR-73	Bridgeport	Westport
46	CT	BR-94	Bridgeport	Shelton
47	CT	HA-08	Hartford	East Windsor / Warehouse Point
48	CT	HA-25	Hartford	Manchester
49	CT	HA-36	Hartford	Portland
50	CT	HA-48	Hartford	Cromwell
51	CT	HA-67	Hartford	Plainville
52	CT	HA-85	Hartford	Avon / Simsbury
53	FL	HM-03 (AKA HM-01)	Homestead-Miami	Opa Locka / Carol City
54	FL	HM-40	Homestead-Miami	Key Largo
55	FL	HM-66 (AKA HM-65)	Homestead-Miami	Florida City
56	FL	HM-69	Homestead-Miami	Florida City / Homestead / Everglades NP

	STATE	NAME	DEFENSE AREA	LOCATION
57	FL	HM-95	Homestead-Miami	Southwest Miami
58	GA	R-28	Robins	Jeffersonville
59	GA	R-88	Robins	Byron
60	GA	TU-28	Turner	Willingsham / Sylvester
61	GA	TU-79	Turner	Armena / Sasser
62	HI	OA-17	Oahu	Kauka / Kahuku
63	HI	OA-32 (double)	Oahu	Bellows AFS / Waimanalo
64	HI	OA-63 (double)	Oahu	Ewa / Makakilo
65	HI	OA-84	Oahu	Waialua / Dillingham
66	IL	C-03 (double)	Chicago-Gary	Montrose / Belmont
67	IL	C-40	Chicago-Gary	Burnham Park
68	IL	C-41	Chicago-Gary	Jackson Park
69	IL	C-44 (double)	Chicago-Gary	Hegewisch / Wolf Lake
70	IL	C-50	Chicago-Gary	Homewood
71	IL	C-51	Chicago-Gary	Worth / Palos Heights / LaGrange
72	IL	C-54	Chicago-Gary	Orland Park
73	IL	C-61	Chicago-Gary	Lemont
74	IL	C-70	Chicago-Gary	Naperville
75	IL	C-72	Chicago-Gary	Addison
76	IL	C-80	Chicago-Gary	Arlington Heights
77	IL	C-81	Chicago-Gary	Arlington Heights
78	IL	C-84	Chicago-Gary	Palatine
79	IL	C-93	Chicago-Gary	Northfield / Skokie
80	IL	C-92/94 (double)	Chicago-Gary	Mundelein / Libertyville
81	IL	C-98	Chicago-Gary	Ft. Sheridan
82	IL	SL-10	St. Louis	Marine
83	IL	SL-40	St. Louis	Hecker
84	IL	SL-90	St. Louis	Alton / Pere Marquette
85	IN	C-32	Chicago-Gary	Porter / Chesterton
86	IN	C-45	Chicago-Gary	Gary Municipal Airport
87	IN	C-46	Chicago-Gary	Munster
88	IN	C-47	Chicago-Gary	Hobart / Wheeler
89	IN	C-48	Chicago-Gary	South Gary
90	IN	CD-63	Cincinnati-Dayton	Dillsboro

	STATE	NAME	DEFENSE AREA	LOCATION
91	IA	OF-10	Offutt	Council Bluffs
92	KS	KC-60	Kansas City	Gardner
93	KS	KC-80	Kansas City	Ft. Leavenworth
94	KS	SC-01	Schilling	Schilling AFB
95	KS	SC-50	Schilling	Schilling AFB
96	LA	BD-10	Barksdale	Bellevue
97	LA	BD-50	Barksdale	Stonewall
98	ME	L-13	Loring	Caswell
99	ME	L-31	Loring	Limestone
100	ME	L-58	Loring	Caribou
101	ME	L-85	Loring	Connor
102	MD	BA-03	Baltimore	Phoenix / Sweet Air
103	MD	BA-09	Baltimore	Fork
104	MD	BA-18 (double)	Baltimore	Edgewood Arsenal
105	MD	BA-30/31 (double)	Baltimore	Tolchester Beach / Chestertown
106	MD	BA-43	Baltimore	Jacobsville
107	MD	BA-79 (double)	Baltimore	Granite
108	MD	BA-92	Baltimore	Cronhardt
109	MD	W-25	Washington	Davidsonville
110	MD	W-26	Washington	Annapolis / Skidmore / Bay Bridge
111	MD	W-35	Washington	Croom / Marlboro
112	MD	W-36	Washington	Brandywine / Naylor
113	MD	W-44	Washington	Mattawoman / Waldorf / La Plata
114	MD	W-45	Washington	Accokeek
115	MD	W-54	Washington	Pomonkey
116	MD	W-92	Washington	Rockville
117	MD	W-93	Washington	Laytonville / Derwood
118	MD	W-94	Washington	Gaithersburg
119	MA	B-03	Boston	Reading
120	MA	B-05	Boston	Danvers
121	MA	B-15	Boston	Beverly
122	MA	B-17	Boston	Nahant
123	MA	B-36	Boston	Ft. Duvall / Hull
124	MA	B-37	Boston	Squantum / Quincy
125	MA	B-38	Boston	Cohasset / Hingham

	STATE	NAME	DEFENSE AREA	LOCATION
126	MA	B-55	Boston	Blue Hills
127	MA	B-63	Boston	Needham
128	MA	B-73	Boston	Lincoln
129	MA	B-84	Boston	Burlington
130	MA	B-85	Boston	Bedford
131	MA	PR-19	Providence	Rehoboth
132	MA	PR-29	Providence	Swansea
133	MI	D-06	Detroit	Utica
134	MI	D-14	Detroit	Selfridge AFB
135	MI	D-16	Detroit	Selfridge AFB
136	MI	D-17	Detroit	Algonac / Marine City
137	MI	D-23	Detroit	Detroit City Airport / Kercheval
138	MI	D-26	Detroit	Ft Wayne / Detroit
139	MI	D-51	Detroit	NAS Grosse Isle
140	MI	D-54 (double)	Detroit	Riverview / Wyandotte
141	MI	D-57	Detroit	Carleton
142	MI	D-58	Detroit	Carleton / Newport
143	MI	D-61	Detroit	Romulus / Dearborn
144	MI	D-69	Detroit	River Rouge Park, Detroit
145	MI	D-86	Detroit	Franklin / Bingham
146	MI	D-87	Detroit	Commerce / Union Lake
147	MI	D-97	Detroit	Auburn Heights
148	MN	MS-40	Minneapolis-St. Paul	Farmington
149	MN	MS-70	Minneapolis-St. Paul	St. Bonifacius
150	MN	MS-90	Minneapolis-St. Paul	Bethel / Isanti
151	MO	KC-10	Kansas City	Lawson
152	MO	KC-30	Kansas City	Pleasant Hill
153	MO	SL-60	St. Louis	Pacific
154	NE	LI-01	Lincoln	Ceresco / Davey
155	NE	LI-50	Lincoln	Crete
156	NE	OF-60	Offutt	Cedar Creek
157	NJ	NY-53	New York	Leonardo / Belford / Middletown / Chapel Hill
158	NJ	NY-54	New York	Holmdel / Hazlet
159	NJ	NY-56	New York	Ft. Hancock
160	NJ	NY-58 (AKA NY-60)	New York	South Amboy

	STATE	NAME	DEFENSE AREA	LOCATION
161	NJ	NY-65	New York	South Plainfield
162	NJ	NY-73	New York	Summit / Watchung
163	NJ	NY-80 (double)	New York	Livingston / Essex Fells / East Hanover
164	NJ	NY-88	New York	Mountain View / Wayne / Packanack Lakes
165	NJ	NY-93/94 (double)	New York	Ramsey / Darlington / Mahwah
166	NJ	PH-23/25 (double)	Philadelphia	Lumberton
167	NJ	PH-32	Philadelphia	Marlton
168	NJ	PH-41/43 (double)	Philadelphia	Berlin / Clementon
169	NJ	PH-49	Philadelphia	Pittman
170	NJ	PH-58	Philadelphia	Swedesboro
171	NM	WA-10	Walker	Roswell
172	NM	WA-50	Walker	Hagerman
173	NY	BU-09	Buffalo	Ransom Creek / Millersport
174	NY	BU-18	Buffalo	Lancaster / Milgrove
175	NY	BU-34/35 (double)	Buffalo	Orchard Park
176	NY	BU-52 (double)	Buffalo	Hamburg
177	NY	NF-03 (double)	Niagara Falls	Model City
178	NY	NF-16 (double)	Niagara Falls	Sanborn / Cambria
179	NY	NF-41 (AKA NF-74 & 75)	Niagara Falls	Grand Island
180	NY	NY-03/04 (double)	New York	Orangeburg / Mount Nebo
181	NY	NY-09	New York	Kensico / White Plains / Harrison
182	NY	NY-15	New York	Ft. Slocum
183	NY	NY-20	New York	Lloyd Harbor / Huntington
184	NY	NY-23	New York	Hicksville / Oyster Bay
185	NY	NY-24	New York	North Amityville / Farmingdale
186	NY	NY-25	New York	Rocky Point / Brookhaven

	STATE	NAME	DEFENSE AREA	LOCATION
187	NY	NY-29/30 (double)	New York	Lido Beach
188	NY	NY-49	New York	Ft. Tilden
189	NY	NY-99	New York	Spring Valley / Ramapo
190	OH	CD-27	Cincinnati-Dayton	Wilmington
191	OH	CD-46	Dayton-Dayton	Felicity
192	OH	CD-78	Dayton-Dayton	Oxford
193	OH	CL-02	Cleveland	Bratenahl
194	OH	CL-11	Cleveland	Painesville
195	OH	CL-13	Cleveland	Willowick
196	OH	CL-34	Cleveland	Warrensville / Highland Hills
197	OH	CL-48	Cleveland	Garfield Heights
198	OH	CL-59	Cleveland	Parma / Midpark Station
199	OH	CL-67	Cleveland	Lakefront Airport
200	OH	CL-69	Cleveland	Lordstown Military Res. / Fairview Park
201	PA	PH-07	Philadelphia	Richboro
202	PA	PH-15	Philadelphia	Newportville / Corydon
203	PA	PH-67	Philadelphia	Chester / Village Green / Media
204	PA	PH-75 (double)	Philadelphia	Edgemont / Delaware City
205	PA	PH-82	Philadelphia	Paoli / Valley Forge
206	PA	PH-91	Philadelphia	Worcester / Center Square
207	PA	PH-99 (double)	Philadelphia	Warrington / Eureka
208	PA	PI-02	Pittsburgh	Rural Ridge
209	PA	PI-03	Pittsburgh	Dorseyville / Indianola
210	PA	PI-25	Pittsburgh	Murrysville / Monroe
211	PA	PI-36	Pittsburgh	Irwin
212	PA	PI-37	Pittsburgh	Cowansburg / Hermine
213	PA	PI-42	Pittsburgh	Elizabeth
214	PA	PI-43	Pittsburgh	Elrama
215	PA	PI-52	Pittsburgh	Finleyville
216	PA	PI-62	Pittsburgh	Bridgeville / Hickman / Bryant
217	PA	PI-71	Pittsburgh	Coraopolis / Beacon
218	PA	PI-92	Pittsburgh	Bryant / North Park

	STATE	NAME	DEFENSE AREA	LOCATION
219	PA	PI-93	Pittsburgh	Westview
220	RI	PR-38	Providence	Bristol
221	RI	PR-58	Providence	N. Kingston / Davisville
222	RI	PR-69	Providence	Coventry
223	RI	PR-79	Providence	Foster Center / Woonsocket
224	RI	PR-99	Providence	North Smithfield / Foster
225	SD	E-01	Ellsworth	Ellsworth AFB
226	SD	E-20	Ellsworth	Ellsworth AFB
227	SD	E-40	Ellsworth	Ellsworth AFB
228	SD	E-70	Ellsworth	Ellsworth AFB
229	TX	BG-40	Bergstrom	Elroy
230	TX	BG-80	Bergstrom	Austin
231	TX	DF-01	Dallas-Fort Worth	Denton
232	TX	DF-20	Dallas-Fort Worth	Terrell
233	TX	DF-50	Dallas-Fort Worth	Alvarado
234	TX	DF-70	Dallas-Fort Worth	Ft. Wolters
235	TX	DY-10	Dyess	Ft Phantom Hill / Abilene
236	TX	DY-50	Dyess	Camp Barkeley / Abilene
237	VA	N-02	Norfolk	Fox Hill
238	VA	N-25/29 (double)	Norfolk	Ft. Story
239	VA	N-36 (AKA N-49)	Norfolk	Kempsville
240	VA	N-52	Norfolk	Deep Creek / Portsmouth
241	VA	N-63 (AKA N-69)	Norfolk	Nansemond / Suffolk
242	VA	N-75	Norfolk	Smithfield / Carrollton
243	VA	N-85 (AKA N-97)	Norfolk	Denbigh / Patrick Henry / Camp Patrick
244	VA	N-93 (AKA N-99)	Norfolk	Hampton / Spiegelville
245	VA	W-64 (double)	Washington	Lorton
246	VA	W-74	Washington	Fairfax / Pohick

	STATE	NAME	DEFENSE AREA	LOCATION
247	VA	W-83	Washington	Herndon / Dranesville
248	WA	F-07	Fairchild	Spokane
249	WA	F-37	Fairchild	Cheney
250	WA	F-45	Fairchild	Medical Lake
251	WA	F-87	Fairchild	Deep Creek
252	WA	H-06	Hanford	Saddle Mt.
253	WA	H-12	Hanford	Othello
254	WA	H-52	Hanford	Rattlesnake Mt.
255	WA	H-83	Hanford	Priest Rapids
256	WA	S-03	Seattle	Kenmore
257	WA	S-13 (double)	Seattle	Redmond
258	WA	S-20	Seattle	Cougar Mountain / Issaquah
259	WA	S-32	Seattle	Lake Youngs
260	WA	S-33	Seattle	Lake Youngs / Renton
261	WA	S-43	Seattle	Kent / Midway
262	WA	S-61	Seattle	Vashon Island
263	WA	S-62	Seattle	Ollala
264	WA	S-81	Seattle	Poulsbo
265	WA	S-82	Seattle	Winslow / Bainbridge Isl.
266	WA	S-92	Seattle	Kingston
267	WI	M-02	Milwaukee	Milwaukee
268	WI	M-20	Milwaukee	Milwaukee
269	WI	M-42	Milwaukee	Cudahy
270	WI	M-54	Milwaukee	Hales Corners / Paynesville
271	WI	M-64	Milwaukee	Muskegon / Prospect
272	WI	M-74	Milwaukee	Waukesha
273	WI	M-86	Milwaukee	Lannon / Menomonee Falls
274	WI	M-96	Milwaukee	Milwaukee
275	WI	MS-20	Minneapolis-St. Paul	Roberts

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Notes

This list only includes "permanent" missile firing batteries, not temporary Nike sites like the field sites established prior to the construction of a base with fixed structures.

This list includes only one entry per battery, not distinguishing launch sites from integrated fire control and/or administrative sites.

In addition to these sites, ARADCOM also possessed bases with Nike headquarters units, maintenance teams, and command and control elements, making the actual dispersion of Nike sites into American communities much larger. Since they possessed far less uniformity of design, location, and

function, and since they were sometimes collocated with installations included in this directory, they have not been listed.

Occasionally the Army collocated portions of firing batteries, yet the Army did not always assign these batteries separate letter-numeral designations. For example, D-14 and D-16 shared integrated fire control sites and D-57 and D-58 shared launch sites. Since all elements of these units were not completely collocated, they are listed separately. In some cases like Nike site NY-58/60, the multiple number designation signified a change in numerical designation, not the presence of two firing batteries, also known as a double site. Of the 275 Nike sites built in the United States, 25 of them possessed double batteries, thus a grand total of 300 Nike firing batteries were deployed across the United States.

Nike site designations begin with the defense area abbreviation (for example MS stands for Minneapolis-St. Paul) followed by a numerical designation. The Army generally (but not always) assigned numerical designations using a 1-100 point "compass" indicating the direction of the site from the center of its defense area. For example, the three Nike sites around Travis Air Force Base, California have numerical designations of (clockwise) T-10, T-33, and T-86.

Publications often include letters after designations (such as SF-88C, SF-88L, or SF-88A) to specify integrated fire control (C), launch (L), and administrative (A) portions of Nike sites.

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Figures

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Figure 1. *A memorial to twentieth century conflicts in Munster, Indiana that ignores the extant Nike missile site visible from the park.* John Smoley.

Figure 2. *"Victory" by Frederick MacMonnies, Battle Monument, West Point, New York.* H. Dexter Hedstrom.

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Figure 6. *Dorothy Hitchcock working on the Range Height Indicator at Fort Lawton, Washington's Missile Master, April 11, 1961*. In "Missile Sites" Folder, Box 3, Air Defense Command Photo Collection, 1934-1970, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

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Figure 39. *Defense contractors joined in the Army-Air Force air defense missile rivalry.* "U.S. Army's Atomic Nike Hercules…to Guard America's Skies," *New York Times,* 26 February 1958, 17.

Figure 40. *The most significant attacks against the Nike network came not from Soviet aircraft but from proponents of the BOMARC missile system.* " History of the 23d Air Division, 1 October 1971 - 31 December 1971." Air Force Historical Research Agency, Maxwell Air Force Base, Montgomery, Alabama, iv.

Figure 41. *Excerpt of a 1958 New York Times article highlighting the pettiness of the Army-Air Force air defense missile rivalry*. "M'Elroy Asks End of a Missile Feud," *New York Times,* 11 September 1958, 7.

Figure 42. *Excerpt of a 1954 San Francisco Examiner article, published well before the construction of most Ajax sites*. "Data on Nike Sites Open to Red Spies: Any Can Obtain by Paying Blueprint Fee," San Francisco Examiner, 10 May 1954.

Figure 43. *Excerpt of an Army Corps of Engineers briefing*. Untitled, undated Army Corps of Engineers briefing transcript, in "Nike - Construction Progress (cont.)," Box XVIII-33 "Military Missile & Space: Anti-Ballistic Missiles, Nike, and Related Programs," Military Files, Office of History, U.S. Army Corps of Engineers, Fort Belvoir, Virginia, 16.

Figure 44. *Two images from ARADCOM's official publication demonstrate how Nike air defense missile system soldiers (above) did not fit the traditional Army look or combat environment (below)*. United States Army Air Defense Command, *ARADCOM Argus* (October 1961) 4 and (July 1959) 12.

Figure 45. *Opening to a 1986* San Francisco Chronicle *retrospective on San Francisco's Nike defenses*. "The Missiles of Scenic Marin," *San Francisco Chronicle,* 30 November 1986.

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Figure 46. *Wreckage from the May 22, 1958 missile explosion at NY-53 in Middletown…* In "Missile Sites" Folder, Box 3, Air Defense Command Photo Collection, 1934-1970, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

Figure 47. *Mary Sullivan addressing a meeting of area residents several days after a fatal Ajax missile explosion at Nike site NY-53 in Middletown, New Jersey*. "Residents Take Blast in Stride," *Red Bank Register*, 28 May 1958, 1.

Figure 48. *Excerpt of an* Associated Press *article appearing in the Minneapolis Morning Tribune, June 1, 1957. Minneapolis Morning Tribune*, 1 June 1957, 3.

Figure 49. *Crewmen fueling or "slugging" an Ajax missile in an early version of the protective suit*. In "Missiles" Folder, Box 3, Air Defense Command Photo Collection, 1934-1970, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

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Figure 50. *Heritage Drive in Middletown, New Jersey provides no clues to the heritage of the small residential subdivision it winds through.* John Smoley.

Figure 51. *Nature may have taken over Nike site C-47L, but the site's setting, as seen from just inside the base's rusting perimeter fence, remains intact*. John Smoley.

Figure 52. *Nike site SF-88A is a telling though rare example of extreme makeovers of Nike sites and differences between Nike sites.* Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part II* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 29-30.

Figure 53. *An open personnel entrance to Nike site C-47's underground missile magazines reveals a problem common to extant Nike sites*…John Smoley.

Figure 54. *Materials used at Nike sites reflect the belief that base buildings like this one at C-47 would outlast the defensive technology they supported.* John Smoley.

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Figure 55. *Newspaper description of a defunct Baltimore Defense Area Nike missile site in 1972*. "Obsolete Nike Site Goes to Seed, Is Up for Sale," *The* (Baltimore) *Evening Sun*, 8 June 1972, F2.

Figure 56. *SF-88C's generator building retains the form and materials it possessed in 1961*…John Smoley; In "San Francisco-Travis" pile, "Site Pictures" Folder, Box 3, Air Defense Command Photo Collection, 1934-1970, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

Figure 57. *SF-88C, 1970*. Stephen A. Haller and John A. Martini, *What We Have We'll Defend: An Interim History and Preservation Plan for Nike Site SF-88L, Fort Barry, California, Part II* (San Francisco: National Park Service, Golden Gate National Recreation Area, 1998) 75.

Figure 58. *High atop Wolf Ridge in the background depicted between these two radar units sits SF-88's actual integrated fire control site.* John Smoley.

Figure 59. *"This may be the only time in your life that you are asked to hold on to a nuclear weapon for safety*." John Smoley

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Figure 60. *Lieutenant General Raymond Shoemaker, ARADCOM commander*… United States Army Air Defense Command, *ARADCOM Argus* (June 1974) 5.

Figure 61. *West German troops examining a Hercules missile at Fort Bliss, Texas*. United States Army Air Defense Command, *ARADCOM Argus* (March 1974) 20.

Figure 62. *Nature appears to have taken Nike site C-47C by force*. In "Missile Sites" Folder, Box 3, Air Defense Command Photo Collection, 1934-1970, U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania; John Smoley.

Figure 63. *The Virginia State Historical Highway Marker Program utilizes a template*… J.J. Prats, "Ira Noel Gabrielson Marker," Database Locator Identification Number p22257, 26 April 2008, The Historical Marker Database [http://www.hmdb.org/Marker.asp?Marker=7433], accessed 2 November 2008; J.J. Prats, "Lorton Nike Missile Site Marker," Database Locator Identification Number p557, 26 March 2006, The Historical Marker Database, [http://www.hmdb.org/marker.asp?marker =2092], accessed 2 November 2008.

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