THEMATIC STUDY AND GUIDELINES: IDENTIFICATION AND EVALUATION OF U.S. ARMY COLD WAR ERA MILITARY-INDUSTRIAL HISTORIC PROPERTIES

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This document provides a national historic context for the U.S. Army's military-industrial involvement in the Cold War (1946-1989). The goal of the project was two-fold: (1) to develop a thematic study on historic properties associated specifically with the military-industrial theme of the Cold War and (2) to provide guidelines for the identification and evaluation of Cold War era military-industrial historic properties in the Army.

The document emphasizes the specific relevance of the Cold War to the Army's military-industrial history, rather than the general context of the Army during the Cold War period. In other words, although there is some discussion of the Army's traditional mission, the focus of this historic context is on what the Army did in direct response to the Cold War. For the purposes of this study, the Cold War is defined primarily as the relationship between the United States and the Soviet Union and is only secondarily defined as the general threat of communist aggression from other sources, such as China.

This document was designed to be used by cultural resources professionals at installations or on contract to the Army. It provides the general overview needed to begin to identify, evaluate, and eventually manage the Army's Cold War inventory. It is a starting block only. The document is designed such that individual chapters can be used alone or as part of the larger document. The narrative history is a stand-alone piece and is supplemented by the timeline provided in the appendices. These can be used to better understand the history of a particular installation within the larger context of global history and the Army during the Cold War period.

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EXECUTIVE SUMMARY

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The document is organized into seven chapters. Chapters 1, 2, and 3 provide an introduction and discuss the goals and methodology, respectively. Chapter 4.0, the Historical Narrative, provides an overview of the Army's Cold War role. During the Cold War, the Army played a critical role in containing the growth of communism in Europe, Asia, and the Caribbean. As the largest military component with ground forces capability, it provided the ground forces necessary to fight any war without resorting to strategic nuclear weapons. This capability enabled the United States and its allies to deter or combat communist expansion without threatening a nuclear exchange. In Europe, the United States committed conventional forces to the North Atlantic Treaty Organization (NATO) that provided military reinforcements to counter the communist armies. In Asia, the U.S. Army fought in two land wars. The first prevented the communist conquest of the South Korean government. The second was an unsuccessful effort to maintain a noncommunist government in South Vietnam. During the years between the close of the Vietnam conflict and the fall of the Berlin Wall, which marked the close of the Cold War with the Soviet Union, the Army became involved in smaller military actions under the mantle of preventing the fall of governments friendly to the United States.

For the U.S. Army, the Cold War era was marked by some significant changes in its methods of operations. During the two world wars, the United States relied on its distance from Europe and Asia to provide time to mobilize and develop its fighting forces. The Cold War required that the United States be prepared to enter combat on short notice. For the first time, the United States stationed its military forces in friendly foreign nations, under an allied command structure, during peacetime. Within the United States, the Army maintained an active force prepared to deploy into combat zones with relatively little preparation. The reserve components, consisting of the Army Reserve and National Guard, were placed in higher states of readiness to complement the active forces. The threat of a communist air or missile attack caused a renewed emphasis on the nation's air defense.

From 1946 to 1989, the primary mission of the Army was to deter or defeat communist growth in conjunction with other services and allied nations, without using strategic nuclear warfare, preferably without using nuclear weapons. A secondary mission was to support the defense of the United States through antiaircraft missiles and antiballistic missiles.

Chapter 5.0 discusses the ten themes that contributed in some way to the accomplishment of the two missions. The themes are based on the variety of functions that had to be integrated for the Army to be successful. These range from supplying the forces with modern equipment and training the soldiers to supporting communications or intelligence. The themes also generally reflect the Army's organization at the close of the Cold War era. For example, the themes of Basic Scientific Research, Materiel Development, and Wholesale Logistical Operations are related to the Army Materiel Command and to obtaining sufficient quantities of technologically superior equipment.

To accomplish the purposes described in the themes, the Army required real property, whether buildings, structures, or open spaces. These properties constitute the physical legacy of the Army during the Cold War. Some properties were unique or extremely unusual; others were common. Some properties were inherited from World War II and adapted for the Cold War; others were constructed during the Cold War. All the properties and the associated themes worked to help the Army function within the context of the Cold War.

Chapter 6.0 discusses property types associated with the U.S. Army during the Cold War era, without regard to their National Register of Historic Places eligibility. Property types are a wide range of resources such as buildings, structures, landscapes, sites, and districts. Not limited to exterior spaces, they include interior features such as floor plans, equipment, and furnishings, as well as objects such as rockets and computers.

For the purposes of this study, properties that are directly related to the Cold War Military-Industrial context are defined as ones that meet any or all of the following qualifications:

1. They were specifically constructed or used prior to 1989 to:

   - Meet the perceived Soviet/communist military threat;
   - Project a force designed to influence Soviet policy; and
   - Affect global opinion of the relationship between the superpowers.

2. Through their architectural or engineering design, they clearly reflect one of the Cold War themes, as described in chapter 5.0.

3. They are directly related to the United States/Soviet relationship through association with a milestone event of the period.

4. They are directly related to a United States/Soviet relationship through association with the life of a person during the Cold War period.

All Army property from the Cold War period that does not fit into the definition of a Cold War Military-Industrial property was developed:

1. Within the context of standard Army development, which would have occurred whether or not the Cold War had taken place (for instance, the construction of administrative offices),

2. Within another Army Cold War context, such as the increase in housing construction that occurred as a result of increased size of the Army, or

3. Within a context not originally related to the Army, such as the Navy during the Cold War (some Navy Cold War properties have been transferred to the Army).

Chapter 6.0 includes a discussion of specific property types used by the Army during the Cold War era, whether they are directly related to the military-industrial effort or to other efforts. The context of the property type is clearly noted so that cultural resources professionals will be able to evaluate the resources within the proper context. The great majority of buildings erected by the Army during the Cold War period are related to troop and employee support (base operations (BASOPS)). Because these resources would have been built (although perhaps not in the same quantity) as part of the normal evolution of the Army, they are not considered to be related to the Cold War military-industrial context discussed in this document. They are listed here (1) to provide the overall context of Army property development during the Cold War period and (2) to provide a more specific guide for installation cultural resources managers for what is excluded from the Army Cold War Military-Industrial Historic Context, and must, therefore be evaluated under other contexts, such as Army Housing.

Chapter 7.0 gives guidance for cultural resources managers or contractors for evaluating the Army's Cold War resources for listing in the National Register of Historic Places. This evaluation involves two steps: the property has to be assessed against specific criteria and it has to be assessed for its integrity. The evaluation takes into account Federal legislation, Army policy, and information provided in this document. Chapter 7.0 provides specific information about legislation, policy, and guidelines, as well as the criteria necessary to evaluate the Army's Cold War resources.

Because only a few of the Army's Cold War resources are more than 50 years old as of the date that this report was prepared, the vast majority of them cannot be evaluated for National Register eligibility under the Register's standard 50-year rule, which states that resources should be at least that old before they can be considered for listing. While it should be noted that some States are willing to consider slightly younger resources, in general, resources that are not 50 years old are not eligible.

Because some properties have clearly achieved local, State, or national significance before they are 50 years old, the National Register provides exceptions to the 50-year rule. *Criteria Consideration G: Properties That Have Achieved Significance in the Last Fifty Years* states that such properties must be of "exceptional importance" to qualify for listing in the Register. The majority of the Army's Cold War properties, if being studied or subject to Section 106 of NHPA, must be evaluated under this "exceptionally important" consideration for the foreseeable future. The Army is specific about what it considers eligible for listing under the less-than-50-year exception. This is discussed in detail in chapter 7.0 and is summarized in the following checklist. The checklist can assist in quickly assessing whether a property is exceptionally significant under the U.S. Army Cold War military-industrial historical context developed in this document.

- Is the resource less than 50 years old, or, if it is more than 50 years old, is its only period of significance less than 50 years old?
- Does the resource directly relate to the Army's military-industrial role in the Cold War?
- Does the resource have national significance?
- Does the resource meet National Register Criterion A, B, C, or D?
- Does the resource retain integrity?
- Does the property display, through physical design or association, any of the themes described in this document and does it do so in an extraordinary way?

If the answer to *all* of the above questions is "yes," then the property *may* qualify for National Register listing under the exceptional importance criterion. However, if the answer to *any* of these questions is "no," then the resource does not qualify under this consideration.

Similarly, if the answer to *any* of the questions below is "yes," then the property *does not* qualify under the Army military-industrial Cold War exceptionally significant consideration.

- Is the resource 50 years old or older, or was its only period of significance more than 50 years ago?
- Was the resource built or established between 1946 and 1989, but is not directly related to the Army's Cold War military-industrial themes?
- Does the resources have only local or State significance?
- Has the resource lost its integrity?
- Does the resource fail to illustrate what is important in the Army's role in the Cold War in an extraordinary way?

It should be noted that although a property may not qualify as an exceptionally significant resource under the military-industrial historical context, it may qualify at a later date under the standard National Register criteria or as an exceptionally significant property under an entirely different context.

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1.0 INTRODUCTION

The objective of the Army Cold War Military-Industrial Historic Context is to present a framework for determining National Register eligibility within a definitive context. This context is a means to more evenly and expeditiously evaluate resources from the Army's Cold War period of significance. The document emphasizes the specific relevance of the Cold War to the Army's military-industrial complex, rather than the general context of the Army during the Cold War period. In other words, although there is some discussion of the Army's traditional mission, the focus of the historical context is on what the Army did in direct response to the Cold War. For the purposes of this study, the Cold War is defined primarily as the relationship between the United States and the Soviet Union and is only secondarily defined as the general threat of communist aggression from other sources, such as China. Although the emphasis of the historic context is the Cold War years (1946-1989), when necessary, information preceding that time is provided to better understand the background or larger context.

The traditional components of a historic context are theme, time period, and geographic area. For this study, the theme is the *Army's military-industrial history*. The time period is the *Cold War: 1946-1989*. In the popular conscience, this period began with Winston Churchill's 1946 Iron Curtain speech and ended with the demolition of the Berlin Wall in 1989. The geographic area encompassed by this study is the *United States*. Although the Cold War was played out in many nations, this study is limited to this country because the purpose of the document is to assist in managing this nation's cultural resources.

This document is divided into seven chapters. The essence of the report begins with chapter 4.0, the narrative of the Army's military-industrial history during the Cold War period. That chapter discusses the global and national political and military climate between 1946 and 1989 with particular emphasis on what the Army was doing during that period to respond to the threat of Soviet aggression. Chapter 5.0 presents general themes, a useful means of organizing this information to create a context in which resources can be evaluated for their significance. The themes are national in scope and do not take into account State and local issues. Property types developed by the Army as part of the military-industrial complex during the Cold War era are discussed in chapter 6.0. Although the discussion does not present a comprehensive look at property types, it defines what a Cold War resource is and provides a solid beginning for what might be considered such a resource. Finally, chapter 7.0 provides the criteria by which these properties should be evaluated for inclusion in the National Register of Historic Places. The document concludes with an annotated bibliography and appendices that include a list of acronyms, a list of existing Army installations at two points during the Cold War, a piece detailing the evolution of the major commands throughout the Cold War, and a timeline.

This document was designed to be used by cultural resources professionals at installations or on contract to the Army. It provides the general overview needed to begin to identify, evaluate, and eventually manage the Army's Cold War inventory. It is a starting block only. The document is designed such that individual chapters can be used alone or as part of the larger document. The narrative history is a stand-alone piece and is supplemented by the timeline

provided in the appendices. These can be used to better understand the history of a particular installation within the larger context of global history and the Army during the Cold War period. The themes chapter provides cultural resources professionals with a means to understand how a particular resource pertains to a specific aspect of Cold War history. The property types chapter is a starting block for inventorying property types found during this period. The first section of the chapter is organized the same way as the themes chapter so that links between themes and property types become readily apparent. Because on-site survey of Army Cold War resources was not a part of this study, the list is not comprehensive. However, it does organize what is known in useful ways. A truly comprehensive list will not be available until a complete survey is undertaken.

2.0 GOALS AND OBJECTIVES

Pursuant to Sections 106 and 110 of the National Historic Preservation Act and the National Register of Historic Places, Federal agencies are required to identify and evaluate historic properties. The Army has addressed periods of significance for historic properties through World War II. The Cold War period (1946-1989), however, does not fall within the customary 50-year waiting period for judging significance for the National Register and the Army, has not had a means by which to objectively evaluate its resources from that period. It has had to apply National Register criteria for exceptional significance when evaluating Cold War resources without having a standard framework for properly assessing these resources.

The purpose of this document is to establish a framework for determining National Register eligibility within a definitive context. This context is a means to more evenly and expeditiously evaluate resources from the Army's Cold War period of significance. The context can serve as one of the essential tools for installations to manage properties associated with the Cold War. Installations should use the context, themes, and the criteria of exceptional significance to identify and evaluate potentially significant Cold War properties that are associated with military-industrial history. Using this document, identified resources can be evaluated objectively against others of their property type, theme, and occurrence.

More specifically, in addition to providing a historical narrative that places the Army within the larger Cold War context, the project had three goals. After developing the historical narrative, the first goal was to describe themes by which Cold War events can be organized and better understood. These themes, in turn, serve as a framework by which property types can be organized and evaluated. A second goal was to produce a list of property types that were developed during the Cold War period. This second goal was realized only partially. Without actual on-site inventory or access to full real estate records, it was only possible to develop a partial list based on archival research and telephone interviews. Finally, because the majority of Army's Cold War properties are less than 50 years old and do not fall under the standard means of evaluating resources for the National Register of Historic Places, the last goal was to generate specific, exceptional significance criteria by which these properties can be evaluated.

The document is meant to be used by trained cultural resources professionals and is a starting point for managing of the Army's Cold War legacy.

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3.0 METHODOLOGY

3.1 BACKGROUND RESEARCH AND LITERATURE REVIEW

The purpose of this task was to collect the materials necessary to develop the Army's Cold War Military-Industrial context, including the narrative, themes, property types, and evaluation criteria. The initial research effort focussed on the global political climate following World War II and how that climate affected the foreign policies of the United States and, consequently, the development of Army initiatives. It also focussed on the Army's organizational and construction history during the post-World War II period. Later research efforts centered on developing themes and the list of associated types of resources.

The researchers began the task by collecting existing reports and information from on-going efforts of the Legacy Program and other programs that specifically address Cold War properties and associated issues. These were reviewed and evaluated. The efforts of other Federal agencies managing Cold War resources were also examined.

Archival research was conducted at libraries and repositories in the metropolitan Washington, D.C. area, the Army Environmental Center, and Carlisle Barracks. Very limited primary research was conducted to fill gaps in secondary source information. The background research and literature search consisted of a combination of library work, visits to Army historians within the Washington, D.C. area, and telephone conversations with historians outside the area. This approach was designed to lay a solid foundation of background information regarding the Army.

The principal libraries visited for this project were the Library of Congress, the U.S. Army Center of Military History, the Association of the United States Army, and the U.S. Army Military History Institute. In addition to standard historical works regarding the U.S. Army, these libraries also contain many specialized studies and reports. The historians at the Center of Military History were able to provide valuable advice and guidance on specific aspects of Army history. The Internet provided information regarding specific installations. It was especially useful where installations had a home page within the Army's directory. The National Register of Historic Places provided insight into designated Cold War properties.

The library work was supplemented by visits or telephone conversations to command historians, who generously provided access to their files, as well as personal insight. The command historian's offices for the U.S. Army Corps of Engineers, the Army Materiel Command, the Army Research Laboratory, the Test and Evaluation Command, the Intelligence and Security Command, and the Military Traffic Management Command were all visited through the course of the project. When distance precluded a personal visit, contact was made by telephone.

Telephone interviews with installation cultural resource managers expanded the research base by providing information on possible Cold War resources at their respective installations. The telephone survey included questions regarding ongoing studies, any identified Cold War properties, the history of the installation, and possible examples of Cold War properties.

3.2 TIMELINE

As one of the initial tasks of the contract, a timeline showing world, political, and Army events or milestones was developed using primarily secondary sources such as other Cold War studies prepared under the Legacy Program. The timeline can be found in appendix D.

3.3 DOCUMENT

This document was prepared in accordance with the U.S. Government Printing Office Style Manual (March 1984 edition).

4.0 HISTORICAL NARRATIVE: THE ARMY DURING THE COLD WAR

This narrative provides the reader with an overview of Army activities during the Cold War period. While it generally focuses on the U.S./Soviet relationship, other issues are also discussed to provide a larger context. Throughout the narrative, examples of property types are given that are associated with the events and themes discussed in the chapter.

During the years of protracted confrontation with the communist world, known as the Cold War, the U.S. Army played a critical role in containing the growth of communism in Europe, Asia, and the Caribbean. As the largest military component with ground forces capability, it provided the ground forces necessary to fight any war without resorting to strategic nuclear weapons. This capability enabled the United States and its allies to deter or combat communist expansion without threatening a nuclear exchange. In Europe, the United States committed conventional forces to the North Atlantic Treaty Organization (NATO) that provided military reinforcements to counter the communist armies. In Asia, the U.S. Army fought in two land wars. The first prevented the communist conquest of the South Korean government. The second was an unsuccessful effort to maintain a noncommunist government in South Vietnam. During the years between the close of the Vietnam conflict and the fall of the Berlin Wall, which marked the close of the Cold War with the Soviet Union, the Army became involved in smaller military actions under the mantle of preventing the fall of governments friendly to the United States. Thus, the Army participated in interventions in the Dominican Republic in 1965 and in Grenada in 1983.

For the U.S. Army, the Cold War era was marked by some significant changes in its methods of operations. During the two world wars, the United States relied on its distance from Europe and Asia to provide time to mobilize and develop its fighting forces. The Cold War required that the United States be prepared to enter combat on short notice. For the first time, the United States stationed its military forces in friendly foreign nations, under an allied command structure, during peacetime. Within the United States, the Army maintained an active force prepared to deploy into combat zones with relatively little preparation, also a departure from previous methods of operation. The reserve components, consisting of the Army Reserve and National Guard, were placed in higher states of readiness to complement the active forces. The threat of a communist air or missile attack caused a renewed emphasis on the nation's air defense.

To support its expanded missions, the Army relied on its infrastructure of installations, largely inherited from World War II and improved to meet the requirements of the Cold War. Army posts served as garrisons for line units, mobilization sites for the Army reserve, and logistical support structures. The logistical installations performed storage, industrial, and research and development functions. Other installations performed specialized functions, including communications and intelligence. These installations form part of the Army's inheritance from the Cold War era. To focus on the Cold War, the Army used, expanded, or constructed property to develop, manufacture, and distribute new equipment; to train soldiers, to maintain units; and to perform the many other functions associated with a modern army.

This narrative is divided chronologically into three sections. The first covers the Truman

and Eisenhower years (1945-1961), when the Cold War developed many of its essential features. These years were characterized by the conflict between the determination of both Truman and Eisenhower to reduce the military budget by relying on nuclear forces at the expense of conventional forces, and the insistence of leading Army officers on maintaining sufficient conventional forces for adequate national security.

The second section covers the 1960s and Vietnam years (1961-1975). The Kennedy administration agreed that conventional forces were essential to national security and adopted the flexible response policy. This second period of the Cold War era is principally remembered in the public conscience as the Vietnam era. The Army fought a lengthy conflict there that ultimately failed to prevent a communist takeover.

The final section discusses the Army's recovery from Vietnam and its modernization drive during the 1980s, and the beginning of the dismantling of the Cold War complex (1975-1989). The historic themes that emerge from this narrative are based essentially on how the Army was organized by function. Among the themes that are discussed in the narrative are basic scientific research, materiel development, wholesale logistical operations, air defense, command and control, intelligence, and the Army School System.

4.1 THE TRUMAN AND EISENHOWER YEARS: 1945-1961.

During the years immediately following World War II, questions about the control of eastern Europe grew into an era of prolonged hostilities with the Soviet Union, better known as the Cold War. As the Soviet Union placed communist nations along its borders in eastern Europe, the United States responded by leading the nations of western Europe in an effort to block further communist expansion. As the Cold War matured, the western nations formed a military alliance known as NATO, which was countered with a communist military alliance known as the Warsaw Pact. After the communists gained control over China, the Cold War spread to Asia and resulted in a bloody, undeclared war in Korea.

The administrations of both President Truman (1945-1953) and President Eisenhower (1953-1961) were characterized by the seemingly contradictory policies of engaging with an increasingly hostile block of communist nations in Europe and Asia, while imposing stringent economy measures. Both presidents tried to reconcile the discrepancy by relying on strategic nuclear weapons, resulting in an increase in funding for the Air Force, particularly its strategic bombers. For the conventional forces, especially the Army, these decisions resulted in years of lean funding. Efforts to maintain strength levels and to modernize World War II era equipment were limited by the budget constraints of both administrations.

Army leaders responded by reasserting their belief in the importance of conventional ground forces and by seeking ways to accommodate the emphasis on strategic warfare. The Army introduced tactical nuclear weapons, antiaircraft missiles, and surface-to-surface missiles as a means of demonstrating its relevance to modern nuclear warfare. At the same time, its leaders publicly asserted that conventional, nonnuclear forces were also essential to national security as a means of countering communist threats that did not justify nuclear warfare.

In this political atmosphere a large portion of the Army budget went to air defense and

nuclear weapons, with its nonnuclear forces receiving a smaller portion of the funds. The ground forces, therefore, improved only slowly. World War II vintage weapons systems were replaced only gradually. Army materiel development remained under the control of the technical services, with a system that had existed since the origin of the Army. The important themes that emerge during this period are air defense and materiel development. Resources related to these themes mark the most obvious form of Cold War property from this particular period.

4.1.1 Transition from World War II to Cold War: The Political Scene

With the close of World War II, President Truman's determination to balance the budget accelerated the decline of the armed forces. When he authorized military funds only after he had provided for civilian needs, the strength of the Army was decreased from 8,267,958 individuals in 1945 to 991,285 in 1947.[1] In this period of demobilization and budget reductions, the Army still needed to maintain a substantial occupation force. The four allied powers---Britain, France, the Soviet Union, and the United States---divided responsibilities for Germany, Austria, and portions of Eastern Europe. The United States attempted to re-establish civilian governments, despite disagreements with the Soviets that would eventually result in a divided Germany. In Asia, American forces divided responsibility for Korea with the Soviets until disagreements led to the creation of two separate governments.

Indeed, disagreements with and fear of the Soviet Union rapidly became the primary concern of the military and diplomatic communities. Determined to secure friendly governments along their borders, the Soviets established communist governments in Poland, Hungary, Bulgaria, and Rumania. The Soviets refused to withdraw troops who had occupied part of Iran during the closing months of World War II. They encouraged communist sides in civil wars in Greece and China. The United States and its citizens became alarmed at the rapid deterioration of relations with their former ally and responded with constant denunciations of the Soviet Union. Despite Soviet protestations that their efforts were necessary to secure their borders, Americans feared that the Soviets were determined to secure world domination as part of an international communist conspiracy. The 1948 Communist-inspired coup in Czechoslovakia amplified the fears of Soviet hegemony in Europe.

The communist expansion led Great Britain's Prime Minister, Winston Churchill, to deliver his famous "Iron Curtain" speech. Speaking at Fulton, Missouri, on 5 March 1946, Churchill declared that "From Stettin in the Baltic to Trieste in the Adriatic, an iron curtain has descended across the Continent." The phrase "iron curtain" would remain a part of the American vocabulary throughout the Cold War. In the public memory, this speech often marks the beginning of the Cold War era.

The diplomat George Kennan also warned of the dangers of Soviet expansion. In the July 1947 edition of *Foreign Affairs,* he argued that the proper response for western nations was to prevent further communist expansion while accepting the Soviet-sponsored governments in eastern Europe as a inescapable fact. Kennan's containment strategy became a centerpiece of U.S. Cold War policy.[2]

President Truman and Congress took another step toward developing a Cold War policy with the decision to provide assistance to the governments of Greece and Turkey, where

communists forces threatened the noncommunist governments in civil wars. The Truman Doctrine stated, "It must be the policy of the United States to support free people who are resisting attempted subjugation by armed minorities and outside pressures."[3]

Germany, and specifically Berlin, became the focus for the most serious early confrontation between communist and noncommunist forces. According to wartime agreements, each of the four allied powers exercised responsibility for specific portions of Germany, pending the eventual completion of a peace treaty. Because of its importance as the capital, Berlin was similarly divided among the four powers, even though the Soviets occupied the surrounding German territory. Berliners were permitted access throughout the city. The situation continued through June 1948, when the Soviets closed the rail and road access into West Berlin, hoping to starve the Berliners into accepting Soviet rule of the entire city. The Americans and British responded by implementing an airlift of critical supplies to the city. For almost a year, the United States Air Force diverted every available aircraft to thwart the Soviet blockade. By May 1949, the Soviets relented and reopened ground access to Berlin.

In September 1949, the American, British, and French governments ended their efforts to negotiate a permanent peace treaty. Consequently, they recognized the Federal Republic of Germany (West Germany) as a separate nation. The Soviets responded by recognizing the German Democratic Republic (East Germany) in their sector. For the remainder of the Cold War, Germany was divided into communist and noncommunist nations. The defense of West Germany became a top priority for the western nations during the Cold War. The United States based military units throughout Europe mostly at former German installations. The Army within the United States maintained forces capable of reinforcing them.

In April 1949, the United States, Canada, and ten western European nations signed a treaty of mutual defense that would solidify the nature of the Cold War in Europe. This pact created NATO as a military and diplomatic alliance. The military features of the treaty grew into an intricate international command structure, with commitments of armed forces from each of the member countries. From the beginning, the United States played a leading role in the alliance. General Eisenhower served as the first NATO commander. Army occupation troops remained in Germany to participate in the defense of western Europe under an international command structure.

United States participation in NATO marked a significant change in the nation's military policy. For the first time, the United States entered a peacetime alliance with foreign nations that included participation in an integrated international command structure. NATO also required the forward deployment of significant numbers of combat units in a friendly foreign nation, another action that had only occurred during wartime. Because the alliance might entail war with the communist nations on short notice, all United States military forces were required to be at a higher state of readiness than had been customary during the pre-World War II years.

The Soviets in turn organized an alliance of communist controlled nations, known as the Warsaw Pact. It consisted of the Soviet Union, East Germany, and the communist-dominated nations of eastern Europe including Poland, Czechoslovakia, Hungary, Rumania, and Bulgaria. The Soviets soon discovered that the reliability of their allies was a major concern. Riots in Poland and East Berlin disturbed the communist domination. In 1956, the Hungarians staged a

full-scale revolt against their communist rulers, which was brutally suppressed by the Soviet Army. The United States and its NATO allies perceived the Soviet domination of eastern Europe as a direct threat to their interests and accordingly strengthened their military forces. Consequently, the United States adopted a policy of containing communist growth while accepting Soviet domination in areas already occupied.

In summary, the traditional American hesitancy about foreign involvements changed into a commitment to contain communism abroad. Events in Europe led the United States to join with other western European nations to prevent further communist expansion and resulted in a divided continent. The nation joined in an unprecedented peacetime alliance that included an international military command structure and the long-term stationing of troops in Europe. Similarly, the United States also expanded its military commitments in Asia in response to the growing perception of a communist threat, due to the communist revolution in China and the Soviet involvement in Korea.

4.1.2 Conversion from World War II to Cold War: Military Aspects

Within the United States, the armed forces were reorganizing in ways that would affect how the United States conducted the Cold War. Traditionally the Army, which was within the War Department, had operated in complete independence from the Navy and Marine Corps, which were within the Navy Department. The air component operated as a part of the Army, although leaders of the Army Air Forces desired independence from the ground forces.

Unifying the armed forces under the Department of Defense that was created by the 1947 National Security Act and creating a separate Air Force were closely connected to the development of atomic weapons. The destruction of Hiroshima and Nagasaki at the close of World War II had proven the awesome power of these new weapons. As the United States then possessed a monopoly over nuclear weapons, it was assumed that the threat of nuclear warfare would serve American objectives without requiring expensive conventional forces, such as Army divisions. Because the Air Force was the only service capable of delivering nuclear weapons, leading airmen argued that funding should be applied toward their service, at the expense of the Army and Navy.

The Air Force arguments for its primacy increased after the Soviet Union successfully exploded its first atomic bomb in September 1949. Although it would be several years before the Soviet Union could develop an operational stockpile, the United States now confronted the possibility of a Soviet nuclear attack upon its population. Air Force generals asserted that their service should receive funding priorities to protect the nation from Soviet attacks and to develop a strong retaliatory capability. For the remainder of the Cold War, both nations built ever-increasing stockpiles of more and more devastating weapons. In fact, the atomic bomb soon appeared primitive compared to the new hydrogen bomb. Yet neither side possessed a monopoly over strategic nuclear weapons. At that time, delivery of nuclear weapons was the domain of the Air Force. The War Department transferred responsibility for the production of nuclear weapons to the Atomic Energy Commission. Remnants of the earliest nuclear weapons program currently within the Army inventory consist primarily of formerly secret storage sites, such as the ones at Fort Hood and Fort Campbell.

As part of the military unification process, the Secretary of Defense brought the Chiefs of Staff together for a conference on the roles and missions of the respective services. The resulting document was known as the Key West Agreement. The Army received responsibility for conducting land warfare, providing troops for occupation duty, and providing for air defense units within the continental United States. Relations with the Air Force were expected to be mutually supportive. For example, the Air Force provided close air support to the Army combat units, as well as air transportation. The Army was responsible for providing air defense artillery to protect air bases both within the United States and overseas.[4] This is discussed in section 4.1.5.

In spite of the 1948 reorganization of the armed forces, funds were still unavailable to fully implement the Agreement. Concern over the poor state of the armed forces following World War II and its consequent reduction in budget and member of forces eventually led to the drafting of a document known as NSC-68 in early 1950. Written by the National Security Council in response to Truman's request for a policy document, the report provided an alarming portrait of western military power compared with the communist nations. It contended that the Soviets were capable of winning a conventional war in Europe and that by 1954 the Soviets would also have a formidable nuclear arsenal. The writers of NSC-68 recommended that the United States embark upon a substantial expansion of both conventional and nuclear forces to counter the perceived Soviet threat. Initial opposition to the findings of the report delayed its signature by President Truman. However, after hostilities began in Korea in 1950, Truman signed it, thereby endorsing the administration's commitment to an expanded defense program.[5]

The Army inherited an enormous network of installations from the World War II era, consisting of both temporary and permanent buildings. To train the millions of soldiers brought into the service during the war, the Army constructed cantonments, typically using a standard design for temporary wooden buildings. The Army either placed temporary buildings on existing posts or constructed entirely new training camps, with additional ranges and facilities for field exercises. In addition to the temporary training facilities, the Army also constructed a permanent network of factories to manufacture ammunition, both conventional and chemical, plus the depots to store the ammunition or other supplies. Special purpose buildings, such as the Ballistic Research Laboratory at Aberdeen Proving Ground, were the product of World War II construction.

With the end of the war, the new installations fell into three categories: those to be sold through the War Assets Administration, those to be converted to permanent installations, and those to be retained only for future mobilization. Many of the World War II training camps, such as Camp Hood, Texas, or Camp Gordon, Georgia, evolved into major Army installations. Others such as Camp McCoy, Wisconsin, were retained for future contingencies and used primarily by reserve components. Similarly, the industrial facilities used to produce and store ammunition were either sold, converted to caretaker status, or maintained as active installations.

In summary, the close of the 1940s saw two seemingly contradictory trends. First, rising tensions with the Soviet Union had created an international situation that would be known as the Cold War. Second, the drive for economy in defense spending had reduced the Army's strength and materiel readiness well below the levels necessary to fight a major war. The themes that are associated with the Cold War, particularly those aligned with defense, were emerging. New property types, however, had not, for the most part, appeared.

4.1.3 Asia and the Korean Conflict

In the far east, military occupation of Japan consumed the majority of the Army's forces immediately following the close of the War. Ground forces consisted of the U.S. 8th Army and its four subordinate divisions which were scattered in small cantonments throughout Japan. Occupation duties consumed so much of the 8th Army's time and resources that it was ill-prepared to fight any type of war. However, toward the close of the 1940s, as the Americans began to fear a Soviet attack on Japan, the 8th Army instituted a modest training program.[6]

Communism in Asia grew with a speed that alarmed political and military leaders in the United States. The most serious communist advances came in China where communist forces under Mao Tse-tung gained popular support against the government of Chiang Kai-shek. By 1949, Mao's forces drove Chiang from the mainland to the island of Taiwan. The United States responded by denying diplomatic recognition to the communist government and treating the Taiwan government as the sole legitimate representative of the Chinese people.

Elsewhere, a nationalist/communist movement led by Ho Chi Minh began a war to expel the French colonial government from Vietnam and French Indochina. After several years of ineffective fighting, the French withdrew from Vietnam in 1954 under an agreement that divided the nation at the 17th parallel. The settlement provided for national elections to reunite the country, but the elections were never held.

The Korean peninsula became similarly divided between communist and noncommunist sections. Prior to World War II, the Japanese governed Korea. Following the war, the United States and the Soviet Union divided responsibility for occupation and restoration of the Korean government. As in the case of Germany, constant disagreements over the shape of the Korean government made the possibility of a unified Korea unworkable. By 1948, the futility of attempting to create a single government was apparent and the United States and the Soviet Union accepted a nation divided along the 38th parallel. National election results produced a conservative, prowestern government in the South, while the communists assumed control over the North. In September 1948, both the United States and Soviet Union withdrew their occupation forces.

In June 1950, following a month of border incidents and radio broadcasts calling for a unified Korea, the North Koreans launched an attack on the south. Within days, it was apparent that the South Korean Army was no match for the North Koreans. Communist forces quickly overran the southern capital of Seoul and moved further south. It soon became clear that United States assistance beyond logistical support would be necessary to prevent a communist victory in South Korea.

The situation presented a dilemma for Truman, the Joint Chiefs of Staff, and other members of the defense bureaucracy. It was assumed that North Korea would only act under the direction of Moscow. Therefore, the invasion might be a diversion to distract scarce American resources from Europe in preparation for Soviet action against NATO. Truman believed, however, if the United States failed to assist South Korea, then free nations everywhere would lack the will to resist communist aggression. Consequently, he ordered General McArthur to

deploy ground combat units from the 8th Army to Korea. Yet throughout the war, the President remained determined to limit the scope of the American commitment to Korea, largely to preserve a capacity to react in Europe. To add further legitimacy to his actions, Truman secured a United Nations (U.N.) resolution condemning the invasions and authorizing member states to repel the attack. Thus the United States operated under the U.N. aegis, and other nations contributed sufficient forces to make the Korean conflict a multinational effort.[7]

During the U.S. Army's initial deployment to Korea in July 1950, Army units were committed piecemeal, hoping that the sight of American units would convince the communists of the futility of their cause. However, given the poor readiness of the American Army, the tactic of sending individual regiments against the communists resulted in heavy casualties.

Nevertheless, despite the piecemeal commitment of forces and the insufficient readiness of the soldiers, the 8th Army managed to delay the communist advance. By September 1950, it was consolidated around the so-called Pusan Perimeter and actually stopped the communist advances. Meanwhile in Tokyo, General Douglas McArthur prepared for an amphibious envelopment of the North Koreans. McArthur organized Marines and Army units from the United States into the X Corps and ordered them to attack the port of Inchon, near the middle of the peninsula. The maneuver was successful, and soon the North Koreans were retreating well above the 38th parallel. The U.N. forces pursued the communists into North Korea.

Up to this point, the Chinese communist government had not directly participated in the conflict. The possibility of an American-allied state along its border, however, prompted the Chinese to threaten intervention if the U.N. advance did not halt. Ignoring the warnings, McArthur pressed forward, determined to reunite the Korean peninsula. In December 1950, the Chinese carried out their threat by attacking in large numbers through the frozen mountains. The U.N. forces retreated, and McArthur advised the Joint Chiefs of Staff that escalating the war was the only alternative to complete defeat.

The prevention of defeat was largely attributable to Lieutenant General Matthew B. Ridgway,who became the Eighth Army Commander. Ridgway initiated limited offensive actions, replaced weak military leaders, and injected his forceful personality into the conflict. By midwinter, the Chinese offensive halted, and the Eighth Army moved northward.

However, it was not until June 1951, when the U.N. forces had reached a highly defendable position north of the 38th parallel, designated as the Kansas-Wyoming Line, that the communist forces signaled their interest in a negotiated settlement. For the next two years, the war continued despite the concurrent negotiations.

In July 1953, the two sides announced an armistice that would end the fighting, but not resolve the conflict. The two armies halted in place and thereby divided Korea into two nations.

For the U.S. Army, the Korean conflict marked an abrupt change from an occupation force to a fighting force. The lack of preparedness for combat initially produced severe casualties. The experience produced a determination in future leaders never again to allow the capabilities of their units to deteriorate to unsafe levels. From that time forward, Army units have been stationed in Korea, increasing the American presence in east Asia.

Army installations in the United States saw new activity as a result of the Korean conflict. World War II temporary barracks and the associated training facilities were once again filled with troops preparing for combat assignments. The Army's industrial facilities were also infused with new movement. Many of the World War II ammunition plants were reopened and renovated. Some began new functions, such as loading of rocket motors and pyrotechnics at the Longhorn Ammunition Plant. The Detroit Arsenal once again began to assemble tanks for service in Korea. Other arsenals experienced increased workloads or new missions. Rock Island Arsenal, for example, began producing mortars and rocket launchers.[8] Themes from this period include operational forces, air defense, and materiel development.

4.1.4 Eisenhower and the New Look

Dwight D. Eisenhower's two terms as President were characterized by an insistence that a sound economy was essential to the national security and that excessive defense spending was detrimental to the economy. Despite his long military career, he was determined to enforce strict economy measures within the Department of Defense.

Eisenhower presided over the military during the height of the Cold War. Tensions with the Soviet Union and its communist allies remained America's most pressing diplomatic and military issue. To contain communist expansion, the United States still required a strong military capability. Eisenhower resolved the problem by relying on nuclear weapons and massive retaliation as a threatened response to any communist expansion. The Eisenhower policy of reliance on strategic nuclear weapons became known as the "New Look." Within this scenario, the Air Force received the bulk of the appropriations, which were generally assigned to the long-range bombers. Missile development, for both the Air Force's Intercontinental Ballistic Missiles (ICBMs) and the Navy's Submarine Launched Ballistic Missiles (SLBMs) also received a high funding priority within the Eisenhower administration. Conventional forces, such as the Army, received limited funding.

Indeed, the question arose about the Army's role in future wars. In a meeting with the Joint Chiefs of Staff in late 1954, Eisenhower reaffirmed his position that future wars would involve massive exchanges of nuclear weapons and that the Army's role would be to maintain order during the war. Later the Chairman of the Joint Chief of Staff, Admiral Radford, advised the Secretary of Defense that the Army's role would be to clean up after a war, to preserve order within the United States, and to occupy a defeated enemy. Eisenhower apparently believed that the mere threat of total nuclear warfare was so unthinkable that he would never really need to employ nuclear retaliation. Consequently, he could preserve the nation's security at comparatively little cost.

Leading Army officers reacted strongly against the New Look. The first major opponent to Eisenhower's policy was Matthew Ridgway, who became Army Chief of Staff in 1953. Ridgway argued that the unthinkable nature of nuclear warfare increased the importance of conventional forces. Following the Soviet development of atomic weapons, the two nations possessed an approximate parity in their nuclear arsenals. The Soviets might attempt to use their numerically superior conventional forces to perpetrate aggressions. Consequently the United States would be left with the choice of either accepting defeat or facing nuclear war. Either choice

would be unacceptable. Ridgway argued that the only reasonable policy was maintaining adequate conventional forces, especially the Army component.[9]

Ridgway's determined opposition to the New Look strained his relationship with Eisenhower and precluded his reappointment as Chief of Staff in 1955. The new Chief of Staff, Maxwell Taylor, proved to be equally adamant in his opposition to the New Look. Instead he advocated a strategy that he termed "Flexible Response," enabling the United States to select from among a variety of options. Although Taylor's views were not accepted within the Eisenhower administration, John F. Kennedy adopted the Flexible Response policy with enthusiasm and brought Taylor back to active duty as Chairman of the Joint Chiefs of Staff in 1962.[10]

For the Army community, these debates about the importance of conventional ground forces versus strategic nuclear forces hindered, but did not stop, its development. The Army was able to improve its materiel posture, but not as quickly as its leaders would have preferred. Moreover, much of the materiel funding went to tactical nuclear weapons and missiles rather than conventional ground forces. For the Army and its installations, these years were a time of slow progress.

Army leaders continued to view the Army's principal role as deterring or defeating communist advances short of strategic nuclear war. To this end, they argued that the Army must preserve the readiness of its forces to engage in hostilities on short notice and against a numerically superior foe. They held that unlike the years preceding World War II, the Army would not have the time to train and mobilize its forces.

The effects of this situation were felt throughout Army installations in various ways. Although the size and level of funding for the Army did not meet the desires of its senior leadership, it greatly exceeded the pre-World War II years. World War II installations that might have closed, such as Fort Hood, Fort Carson, or Fort Polk instead were modernized to hold an expanded Army. Other posts, such as Camp Drum or Indiantown Gap Military Reservation, were maintained with few changes to train the expanded Guard and Reserve forces. Unlike the post-World War I demobilization, the Army maintained its logistical structure at a level capable of supporting a war upon relatively short notice. For example, during the Korean conflict ammunition plants and a tank factory were placed in operational status and kept operational during the Cold War.

Personnel who served at these installations perceived themselves as serving to prevent communist expansion. Career soldiers could expect one or more tours in Germany, where they faced Warsaw Pact forces directly. Soldiers within the continental United States understood that they might be deployed to Europe or Korea. Breaking with a long tradition of voluntary military service, Congress enacted the Selective Service (draft) to meet the expanded forces requirements. In a move that was, perhaps, more radical for its time, the services accepted women to meet the personnel requirements of the Cold War situation. These changes were accepted because the perceived threat of communist aggression created personnel requirements in excess of the available male volunteers.

Another sharp contrast from the 1930s attributable to the Cold War was the expanded use

of technology. During the pre-World War II years, Army development of new types of ground equipment, such as the tank, went forward slowly and sporadically. During the Cold War era Army leaders eagerly sought every advantage that could be gained through new technology, and Congress funded these innovations. To be sure, the pace of technological innovations was less than Army leaders desired, especially when compared to the Air Force. Nonetheless, the technological innovations were real and would increase throughout the Cold War era. The most notable examples of technological innovation during the 1950s included nuclear weapons, missiles, and helicopters. Traditional weapons such as tanks and artillery improved, but incrementally. These themes of materiel development and wholesale logistics manifested themselves in property throughout what is now the Army Materiel Command and include laboratories, research and development centers, arsenals, depots, and proving grounds.

4.1.5 Tactical Nuclear Weapons, Missiles, and Air Defense

Even as they voiced misgivings about the New Look, Army leaders also faced the realization that Soviet and American nuclear capabilities would dominate defense strategy. The Army therefore needed to adapt to the requirements of nuclear warfare. Although they feared the consequences of massive retaliation, Army leaders believed that smaller nuclear weapons might play a useful tactical role. The possibility of Soviet air attack expanded the traditional role of the Army in air defense, especially with the introduction of guided antiaircraft missiles. U.S. Army officers also perceived that short and intermediate range surface-to-surface missiles could be used on the battlefield to extend both the distance and firepower of tractional tube artillery.

During the early 1950s, the Army introduced a distinction between strategic and tactical nuclear weapons. Strategic weapons, which included heavy bombers, ICBMs, and SLBMs were intended to strike into an enemy's heartland and destroy its industrial capacity. In contrast, tactical nuclear weapons were comparatively low-yield weapons that were intended to influence a ground combat action. Army tactical nuclear munitions could be delivered by heavy artillery or by missiles.

During the Truman administration, the Army conducted research on an artillery piece capable of delivering nuclear rounds. In 1953, it proudly presented the 280mm "atomic cannon" at Eisenhower's inauguration. The piece could fire a nuclear or high-explosive warhead approximately 17 miles. Its 83-ton weight required two tractors, one in the front and one in the rear, to move it. Although seemingly impressive, the weapon was of limited real use. To protect the weapon from possible enemy attack, the Army needed to keep it well behind friendly lines, which made its 17-mile range a serious defect for the few lucrative targets that would be within its range. The cumbersome weapon was as much a hindrance to a unit's mobility as a tactical asset.[11]

The "Davy Crockett" was a similarly flawed concept in nuclear weapons. It was a very low-yield weapon (equal to about 1/2 kiloton of TNT) that could be launched from a small rocket. It was intended to provide firepower to infantry units, down to battalion level. However, its 1.5- mile range and its limited accuracy made it extremely difficult to use without endangering friendly troops. It was withdrawn shortly after it was introduced. Working with the Atomic Energy Commission and Picatinny Arsenal, the Army eventually developed nuclear rounds that could be fired from medium and heavy artillery, thus allowing nuclear artillery capability that could be used in battle.[12]

The development of tactical nuclear weapons, like most ordnance modernization, required the contribution of numerous agencies and activities. Both the Watervliet and Watertown arsenals claimed a role in the production of the 280mm artillery piece, while the Watervliet Arsenal alone produced the Davy Crockett. Although the Atomic Energy Commission (AEC), a non-Department of Defense agency, had lead responsibility for producing nuclear ammunition, workers at Picatinny Arsenal worked closely with the AEC to fabricate the rounds for these guns.[13]

The new weapons were test fired at multiple locations. Both Fort Sill, Oklahoma, and Aberdeen Proving Ground were used to test fire the 280mm artillery, using simulated nuclear rounds. The test firing of a real nuclear round occurred in the Nevada desert at a location known as Frenchman's Flat.[14]

Fort Sill, Oklahoma, the location of the Field Artillery School, was a center for education in nuclear munitions and development of Army doctrine for atomic weapons. To provide a facility where students could study classified information, the Artillery School conducted classes at Knox Hall. A windowless, concrete block building, it was designed specifically for information security.

With the development of nuclear weapons, the military faced new materiel storage requirements. Initially the Department of Defense used secret installations to store nuclear munitions. One such site near Camp Hood, Texas, was designated the Killeen Base. It consisted of tunnels carved out of the limestone. Control over this particular facility passed between the Army and Air Force. Later, persistent rumors developed that the Army also used selected ordnance depots to store nuclear munitions.

The Army's missile program was one of its most important efforts to incorporate modern technology during the 1950s as part of its effort to adapt technology to Cold War requirements. Both surface-to-air (antiaircraft) and surface-to-surface missiles played an important role in Army planning and operations. The antiaircraft missiles were designed for both defending the United States and theater of operations. Surface-to-surface missiles were employed as a more potent form of field artillery.

During the closing days of World War II, German rocket scientists, led by Wernher von Braun, secretly traveled to the western front so that they could surrender to the United States rather than the Soviet Union. Army officers welcomed their technical skills and their volumes of research notes with the expectation of creating a missile program. The scientists were transported to the United States and eventually to White Sands Missile Range.

White Sands Proving Ground, located in New Mexico, became the earliest testing ground for rocketry. Here the German expatriates built a launch pad to fire a revised version of the V-2 missile, which was a reconstruction of the missile used by Germany against the allies. The facilities at White Sands offered the opportunity to experiment with improvements on the weapon. Concrete bunkers were constructed to observe the testing, and platforms were built for mounting observation equipment. Berms were installed near the impact area to protect the monitoring equipment.[15]

In 1950, the Army established a center for rocket and missile research at Redstone Arsenal in Huntsville, Alabama. Because the site had been used by Ordnance and Chemical Corps for chemical munitions production during World War II, it possessed widely dispersed production facilities, which were ideal for conducting research in rocketry. Redstone became a leading center for research in rockets and missiles. It contained static test stands, laboratories, and office space.[16]

On the battlefield, missiles offered the opportunity to improve the distance and firepower of traditional artillery, especially with nuclear warheads. Faced with numerically superior Warsaw Pact forces, the Nato nations sought every advantage available. Consequently, the work at White Sands and Redstone Arsenal resulted in missiles such as the Corporal, the Honest John, and the Little John.[17]

Missile development also affected the Army's air defense program. Traditionally, the Army provided air defense to the continental United States in a mission that evolved from the role of the coastal artillery in defending American boundaries. Following Soviet development of nuclear weapons, the United States faced the possibility that Soviet bombers might reach the United States. Consequently, the Army organized the Antiaircraft Command in July 1950 to coordinate the defense against Soviet bombers. Antiaircraft batteries were equipped with a new radar-directed 75mm gun known as the Skysweeper. Both the Watervliet and Watertown Arsenals played a role in producing and developing the Skysweeper.[18]

Because guided missiles offered more potential for air defense, the Army developed its Nike family of antiaircraft missiles. The Nike Ajax was the first such missile, with a comparatively short range of 25 miles. Its liquid fuel and vacuum tube electronics created problems with reliability. Nonetheless, by 1954 224 Nike Ajax batteries were deployed throughout the nation. The Nike Hercules offered a more powerful alternative for air defense. Its solid fuel propulsion and solid state electronics increased its reliability. The Hercules could use a nuclear warhead to breakup massed bomber attacks. The first Hercules battery was deployed near Chicago in 1958. Thereafter, batteries were installed throughout the nation.[19]

The Army's role in continental air defense also led to the beginnings of a ballistic missile defense program. Fearing the potential of a Soviet missile attack, the Army began experimental work with Bell Laboratories to perform computer simulations of missile interceptions. The work convinced the Army that an antiballistic missile (ABM) system was feasible. Consequently, it began work on the Nike Zeus system, as the nation's first ABM system. The Air Force objected to the Zeus system, claiming that missile defense should be the Air Force's responsibility. In 1958, the Secretary of Defense decided to allow the Army to proceed with its Zeus program, which allowed it to become the lead service for antiballistic missile systems.[20]

The bulk of the design and administrative work related to antiaircraft missiles was performed at Redstone Arsenal, as was the case for surface-to-surface missiles. For guidance systems, the Army acquired a plant in North Carolina from the General Services Administration, which it designated as the Tarheel Army Missile Plant.[21]

To facilitate testing its air defense missiles, the Army established the Kwajalein range on a small atoll in the Marshall Islands. The islands had been a Navy base since their seizure from Japan during World War II, and in 1959, they were used as a tracking station. The Army built

sophisticated radar and monitoring equipment to follow the flight of missiles flying over the central Pacific.[22]

Before the creation of the National Aeronautics and Space Administration (NASA), the first efforts at space exploration were directed by the military. In the wake of the successful Soviet Sputnik satellite, American efforts to place a satellite into orbit were perceived as essential for both national prestige and to prevent Soviet domination of outer space for military purposes. The Army's most significant contribution came with the first successful American satellite, the Explorer, which was designed at Redstone Arsenal. In 1958, Congress established NASA, and primary responsibility for outer space exploration was transferred to the civilian agency with the military assuming a supporting role.

In summary, the Army's work in missiles and nuclear weapons formed a significant portion of its efforts to modernize during the 1950s. It demonstrated an ability to adapt to modern technology. Despite the misgivings of Army leaders about the New Look, continental air defense created a role in defense strategic planning for the Army, with a comparable portion of the Department of Defense budget. In addition, the Army established itself as a leader in both surface-to-surface and surface-to-air missiles. The important themes of the 1950s were basic scientific research, materiel development, and air defense.

4.1.6 Beginnings of Army Aviation

When confronted by the massive Warsaw Pact armies, the United States and its allies required a means to use their forces more effectively. Army aviation, especially helicopters, offered a means of adapting a new technology to military requirements. Although the military had experimented with helicopters before World War II, the potential for helicopters truly emerged during the early 1950s as tests showed the potential for aviation to move troops across a battlefield. The limited experience of helicopters in Korea further demonstrated their potential. As the decade progressed, Army aviation was used for reconnaissance, medical evacuation, and fire support (provided by helicopter gunships). Aviation provided one more example of the Army's efforts to fight in Europe or elsewhere using weapons below the nuclear threshold. This early work in Army aviation laid the foundation for expanded use of helicopters beginning in the 1960s.

Fort Rucker, Alabama, emerged as the center of Army aviation with the creation of a school to train pilots in 1954. Recognizing the need for a separate installation as an aviation school, the Army re-opened the abandoned World War II installation and changed its designation from Camp Rucker to Fort Rucker. Although the Army also used Camp Wolters, Texas, for some aviation training, Fort Rucker has remained the home of Army aviation. In time, activities at the installation have expanded from training to experimentation with new ways of using helicopters. For example, the first tests of helicopters as gunships were conducted at Fort Rucker.[23]

By the close of the 1950s, Army aviation had evolved well beyond the few light airplanes used at the beginning of this period. With the appearance of the helicopter, the Army had an aircraft that was ideal for supporting ground operations. Helicopters could transport troops and supplies, perform artillery observation, evacuate wounded personnel, and generally support

ground combat. The Army was experimenting with air mobile units, transported by helicopters, and with armed helicopters that could be used to support ground forces. These beginnings became the basis for the extensive aviation program of the Vietnam era.

4.1.7 Other Army Modernization

The Army's network of installations and real property existed to support its mission of providing ground combat forces in support of national policy. As such, it reflected the intricate structure of the Army, with its combat and logistical components. To understand the role of Army property, it is necessary to fully understand the other changes within the Army during the Truman and Eisenhower years.

One of the early problems of post-World War II adjustment was to create a suitable command structure for units within the continental United States. During World War II, command of Army ground units other than the technical services was assigned to an organization known as the Army Ground Forces. With the close of the war, the Army Ground Forces headquarters was disbanded and replaced by the Army Field Forces and six numbered armies. The numbered armies were created in an effort to divide administrative responsibility geographically. Each numbered army was typically commanded by a lieutenant general and operated within the boundaries of several States. This arrangement lasted until 1955, when the Army activated the Continental Army Command (CONARC), whose commander exercised command over the subordinate numbered armies. Logistical responsibilities were assigned to the technical services, which will be discussed in a later section.

The majority of installations under the CONARC performed missions associated with manning or training Army forces. Many of the largest installations were garrisons for deployable units. Fort Bragg began its long association with the 82nd Airborne Division and XVIII Airborne Corps during the 1950s. An even smaller post such as Fort Meade was home to the 11th Armored Cavalry Regiment. Installations such as Camp Drum, New York, were used primarily to train reserve components and changed little from their World War II appearance. Equally important was the CONARC school system, which included branch schools for the combat arms and special schools such the Army Command and General Staff College. CONARC, however, was not responsibe for installations that performed logistical functions, such as depots or ammunition plants, nor was it responsible for schools that trained the logistical branches. The technical services performed these functions.

At the same time, the Army adjusted its structure for infantry organizations to operate behind enemy lines by disbanding rangers as a separate organization and creating the Special Forces. Believing that future wars would involve tactical nuclear weapons, the Army sought ways to fight upon a nuclear battlefield. The divisions were reorganized into the so-called "pentomic" division, which was intended to allow rapid dispersal and concentration.[24] Although the active ranger companies were disbanded, the Army found an advantage to the rigorous training offered to the prospective rangers. Consequently, it kept the ranger course as a part of the Infantry School at Fort Benning. With phases in Fort Benning, the Georgia mountains, and the Florida swamps, ranger training became a grueling "rite of passage" for junior officers and noncommissioned offices (NCOs).[25]

The Special Forces had a substantially different mission from the rangers. They were designed to operate behind enemy lines for extended periods of time, not so much to fight as to organize local partisan units. The idea originated with Office of Strategic Services (OSS) agents who parachuted into France during World War II. Seeing an advantage to this type of operation, the Army authorized the 10th Special Forces Group in 1952. Its basic unit was a small team of 5 to 12 soldiers, each designated as a specialist in a specific area (e.g., communications, medicine, weapons) who could impart skills to indigenous guerrillas. Fort Bragg, North Carolina, became the training center for Special Forces and the 10th Special Forces Group was stationed in Badtolz, West Germany. Especially during the early years, the Special Forces recruited eastern European expatriates who received authorization from Congress to join the United States Army.[26]

Passage of the Armed Forces Reserve Act of 1952 helped to shape the Army Reserve as a distinct portion of the Army's reserve components. This law established the Army Reserve as a replacement to the Organized Reserve Corps and authorized a Ready Reserve, Standby Reserve, and Retired Reserve.[27]

Conscious of its public image and the need to maintain morale among its personnel, the Army initiated improvements to its posts, especially for property associated with base operations. With the other services, it constructed new family housing authorized by the Wherry Act. Concrete barracks replaced the wooden World War II temporary buildings, even though many World War II buildings would remain for decades.[28]

4.1.8 The Technical Services and Materiel Development

The United States Army endeavored to increase its effectiveness against the Warsaw Pact nations and other potential adversaries through materiel readiness. Its leaders sought weapons that were technologically superior, better maintained, and in greater quantities than any potential adversaries'. Materiel development during the 1950s reflected the competing priorities for funding that existed within the Army. Programs for Army missiles and nuclear weapons, with their implementation of modern technology, received the highest priority for funding. Conventional forces, including infantry, armor, artillery, aviation, and their supporting structure remained essential to the Army mission, yet their materiel development was hindered by the emphasis upon missiles and nuclear weapons.

It is important to remember that although the pace of equipment modernization failed to meet the expectations of Army leaders, it still greatly exceeded the pre-World War II experience. Materiel development remained an important component of the Army's overall mission of containing communist advances with conventional weapons. As such, it is a vital part of the Army's Cold War history.

Logistical functions before 1962 were performed under the direction of the technical services, which included the Ordnance Department, Chemical Corps, Quartermaster Corps, Transportation Corps, Signal Corps, and Corps of Engineers. The Surgeon General's office and medical branches were also classified as part of the technical services. Each of the technical services had full responsibility for support functions within its area of specialization. These duties included materiel development, procurement, storage and maintenance of equipment, personnel management, training, doctrine, and limited operational responsibilities. For example, the Chief

Signal Officer was responsible for all aspects of radios and electronics, including laboratories, development work, and a Signal Corps depot system. He also trained and managed branch personnel and directed the operations of Signal Corps schools. In addition, he was responsible for the Army's strategic communications systems. Similarly, the Chief of Ordnance directed all activities related to weapons, ammunition, and fighting equipment, while the Quartermaster General managed general supply items and field services. As the Army aviation program grew, the Transportation Corps assumed responsibility for helicopter maintenance. The key point regarding the technical services system is that it created six different logistical systems, as well as various personnel and school systems. Each of the chiefs of the technical services reported directly to the Army Chief of Staff, without a formal requirement for coordination between the branches.

Each of the technical services operated its own network of logistical installations, with the Ordnance Department having the largest number. Typically, one installation served as the site of the branch school, often with laboratories or ancillary facilities at the same post. Fort Monmouth, for example, was the home of the Signal Corps, with both a school and laboratories at the post. Fort Belvoir, home to the Engineer School, also contained an Engineer Proving Ground located a few miles from the main post where the engineers could experiment with new equipment.

Depending on their specific mission, many technical services also maintained a research and development capability. Signal Corps laboratories at Fort Monmouth continued to perform important work in communications and electronics. In 1953, the Office of the Quartermaster General opened the Natick Laboratories for developing troop support materials, such as clothing, tentage, and food. The facility contained devices such as a climatic chamber for evaluating the effectiveness of clothing under extreme conditions. The Chemical Warfare Service operated its research and development facilities at the Edgewood Arsenal, with a second complex of laboratories for biological warfare at Fort Detrick, Maryland. The Surgeon General's Office and the Corps of Engineers both maintained a system of specialized research facilities, with the Engineer laboratories intended to support both the civil and military functions.

The Ordnance Department's research facilities included its laboratories, plus the developmental work performed at arsenals. Its Ballistic Research Laboratory at Aberdeen Proving Ground continued its previous work in ballistics and weaponry. The ENIAC, a World War II version of a computer and a technical marvel for its time, was developed at the Ballistic Research Laboratory toward the close of World War II and used through the early years of the Cold War. In Adelphi, Maryland, the Harry Diamond Fuse Laboratories expanded into a leading center for work in ordnance- related electronics. Ordnance Department arsenals had traditionally performed both production and developmental services. Arsenal workers were highly skilled personnel who could produce models and prototypes to be used in developmental work.

The technical services each operated their own depot systems. As in World War II, there were two type of depots: general storage depots and ammunition (or ordnance) depots. General storage depots generally consisted of warehouse space, with occasional open storage space. For the most part, the technical services relied on their World War II depots, although the Signal Corps constructed a new facility, the Tobyhanna Depot, in Pennsylvania. The Ordnance Department inherited a vast network of ammunition depots from World War II. These consisted primarily of specially designed structures, popularly termed igloos, which were widely separated to prevent the spread of an explosion. Through the course of the Cold War, Ordnance

Department depots assumed an increasingly important role for complete maintenance and overhaul of equipment. Letterkenny Ordnance Depot, Pennsylvania, for example, had a large vehicle overhaul building constructed in 1956.

The Ordnance Department also maintained a substantial network of production facilities, largely inherited from World War II. During the war, the Army had relied upon an enormous system of Government-Owned Contractor-Operated (GOCO) plants to produce ammunition. Following the war, many of these factories were dismantled or placed in a caretaker status. Others, however, remained active. The Ordnance Department also kept a system of arsenals that served two functions. Government arsenals could serve as production facilities to produce items in quantity. They could also produce prototype models and work with process development. Watervliet Arsenal, New York, continued to produce field artillery, especially large caliber tubes. Watervliet produced the barrels for almost all howitzers and tank guns. This arsenal also was the site for some research and development work, although its Benet Laboratories did not open until 1962. Watertown Arsenal, Massachusetts, had been a production facility for coastal artillery and, with the shifting emphasis on air defense, the arsenal produced the 75mm "Skysweeper" antiaircraft gun. Springfield Armory, also located in Massachusetts, made prototypes and limited production models of small arms, including the new M-14 rifle. The Detroit Arsenal, a World War II factory designed by the noted industrial architect Albert Kahn, continued to produce tanks. Picatinny Arsenal had long been the Ordnance Department's center for developing large ammunition, such as artillery. During the 1950s, it continued production on a limited scale, usually for exceptional requirements. Picatinny expanded its research and development functions as its technicians developed improved ammunition, including nuclear munitions. The shops at Frankford Arsenal specialized in optical instruments, electronic fuses, small arms ammunition, and ordnance-related electronic items. The shops were intended primarily for developing the production processes and producing only limited quantities of any item.

The final step in the materiel development process was product testing. Aberdeen Proving Ground was the Ordnance Department's principal testing area, with White Sands Missile Range serving as the testing location for the new missile program. The Ordnance Department also operated smaller proving grounds, of which Jefferson Proving Ground, Indiana, and Yuma Proving Ground, Arizona, are the remaining installations. The Signal Corps concluded that it required a location relatively free from electronic interference to test its new equipment. In 1954, it opened the Electronic Proving Ground at Fort Huachuca, Arizona, where the distance from commercial broadcasting enabled it to test its equipment. The Corps of Engineers operated a small proving ground in Fairfax County, Virginia, as an annex to Fort Belvoir.

4.1.9 Chemical Warfare

Although lethal gases had not been used to a large extent during World War II, chemical warfare remained an important concern of the U.S. military. The Army's Chemical Warfare Service was also responsible for toxic agents, as well as flame, smoke, pyrotechnics, herbicides, and irritants (tear gas). These types of munitions were produced throughout the Cold War era and were used in Korea and Vietnam.

During World War II, the United States and its allies produced and stockpiled large quantities of lethal gases, especially phosgene and mustard gas. At the close of the war, allied

armies discovered large stocks of German gases, including previously unknown nerve agents. The allies were convinced that only the allied stockpiles of chemical weapons deterred the Germans from using gas warfare. As the Cold War developed, the United States once again began to develop a retaliatory capability for both chemical and biological weapons, with the justification that only a credible allied capability could prevent the Warsaw Pact from using chemical agents. Nerve agents, which were remarkably swift and lethal, were produced on a large scale, although all other agents were also produced.

Because many Nazi production facilities for nerve agents were in eastern Germany, the Soviet occupation of that region gave the Soviets the technology to make nerve agents. Intelligence estimates of Soviet chemical capabilities convinced Army leaders that the Soviets were prepared to use lethal gases and that the United States must maintain a credible deterrent. Warsaw Pact troops were reported to be conducting extensive training in chemical defensive measures, while aerial reconnaissance showed substantial storage facilities for chemical weapons.[29]

In maintaining a chemical warfare capability, the Chemical Warfare Service also operated its own network of installations, which performed functions from basic research to storage. Laboratories at Edgewood Arsenal performed research in chemical weapons, including pilot production processes. Fort Detrick, Maryland, became the center for research into biological warfare, for both retaliatory and defensive purposes. Two World War II arsenals, Pine Bluff and Rocky Mountain, produced of all types of chemical munitions. The Army also built a plant for producing the nerve agent VX at Newport, Indiana. Dugway Proving Ground, another installation remaining from World War II, was well suited to testing toxic agents because of its isolated location in central Utah. The adjacent Tootle Depot served as a storage site for chemical munitions.

The themes of basic research, materiel development, wholesale logistics, and Army schools are all applicable to the Army's chemical wartime posture.

4.1.10 Communications and Intelligence

The Signal Corps played a vital role among the technical services. Its mission of ensuring adequate communications at all levels within the Army produced a scientific focus at the same time that it produced an organizational structure designed to serve the Army. The Signal Corps was responsible for training military personnel, providing communications equipment to units, maintaining and supporting that equipment, developing new equipment, performing the basic research for future progress in communications, and operating the Army's strategic communications systems. Like the rest of the Army, the Signal Corps underwent significant reductions with the close of World War II. It lost control of the Army Command and Administrative Network (ACAN), which was its strategic communications network. Signal intelligence functions were transferred to the new Army Security Agency (ASA).[30]

With the post-war demobilization, Signal Corps functions were consolidated at Fort Monmouth, New Jersey. The need for more real estate, however, caused the Signal Corp to open an additional school at Camp Gordon, Georgia. In 1954, the Signal Corps opened the Electronic Proving Ground at Fort Huachuca, Arizona.

The scientific contributions of the Signal Corps are particularly impressive. Since the 1930s, Fort Monmouth had been home to electronics laboratories known as the Cole, Squire, and Evans laboratories, which were collectively called the Signal Corps Engineering Laboratories. In 1954, the Signal Corps constructed a new, specially designed building at Fort Monmouth to consolidate and improve its research functions. The building was called "the hexagon" because of its unusual shape. Engineers at Fort Monmouth worked in conjunction with commercial electronics firms to develop the transistor, a solid state replacement to vacuum tubes, which would change communications technology. Later, the technology that was used to create the transistor would lead to the integrated circuit and the subsequent computer revolution. Signal Corps laboratories also expanded the range of electronic equipment available to Army aircraft (known as avionics) to include navigation aids, flight instruments, and aircraft identification systems. The Signal Corps also developed flight operations centers that could be mounted in vans and used near the front lines.[31]

Equally impressive were the contributions the Signal Corps made to the early space program. As early as 1946, Signal Corps laboratories at Fort Monmouth succeeded in bouncing radar waves off the moon, thus demonstrating that humans could transmit radio signals through outer space. As the United States launched its first satellites, Signal Corps expertise at Fort Monmouth contributed to the design of electronic components for the Explorer and subsequent satellites. Even after the primary responsibility for space exploration shifted to NASA, the Signal Corps continued to make important contributions through such innovations as developing ultra-high frequency communications.[32]

The history of the Army's intelligence activities during the early history of the Cold War was closely connected to the Signal Corps because of the value of intercepted communications to intelligence efforts. Conversely, protecting and encrypting of friendly communications is essential to preventing an enemy from acquiring information. During World War II, the Signal Security Agency, a part of the Signal Corps, worked in conjunction with British intelligence analysts to break the German and Japanese coding systems, providing an enormous advantage to the allies. In September 1945, the Signal Security Agency was redesignated the ASA, and it reported to the Army G-2 (the intelligence section of the Army headquarters staff). Its mission remained one of communications intelligence and communications security. In 1949, the Department of Defense created the Armed Forces Security Agency (later the National Security Agency) to coordinate cryptological intelligence for all services. The ASA remained, however, the Army's lead agency for communications intelligence and counter-intelligence. With the onset of the Korean conflict, the ASA shifted its functions toward tactical intelligence, that is providing units close to the front lines with information about enemy movements.

The ASA kept two of its most important World War II installations. Its headquarters at Arlington Hall Station, Virginia, was a converted girl's finishing school that had been acquired during the war. Outside of Warrenton, Virginia, Vint Hill Farms was an important monitoring station, and a center for experimenting with signal intelligence equipment. During World War II, Vint Hill Farms was the site of the Signal Intelligence School, but after the war the ASA school was moved first to Carlisle Barracks and shortly afterwards to Fort Devens, Massachusetts.

Analyzing aerial photography, interrogating prisoners and analyzing captured documents

have been other important means of gathering intelligence. As the Korean conflict developed, it became apparent that the Army required a stronger ability to collect human intelligence. To meet this need, the Army introduced military intelligence units, as large as battalion and group levels, into Korea. To provide more professionalism to its intelligence efforts, the Army expanded its Counter Intelligence School at Fort Holabird, Maryland, and made it the Army Intelligence School.[33] Thus, the themes of communications and intelligence were adapted to a Cold War role.

4.1.11 The Close of the 1950s

With the close of the 1950s, the Army emerged from an era that Maxwell Taylor later described as its "Babylonian Captivity."[34] Despite the rising world tensions of the Cold War, budget restraints during both the Truman and Eisenhower administrations had seriously affected the Army's ability to fight a war with conventional weapons. Both administrations emphasized the use of strategic nuclear weapons, giving a lower priority to conventional forces, including the Army.

In reply, leading Army officers, most notably Matthew Ridgway and Maxwell Taylor, argued that conventional forces, especially the Army, were indeed necessary for the nation's security. The excessive reliance on strategic nuclear weapons left the nation vulnerable to the Soviets' superiority in conventional forces. Consequently, the communists might use their Army to force a choice between incremental defeats or nuclear holocaust. Taylor gave one of the strongest expressions of this view in his call for a flexible response strategy.

In other respects, the Army worked to adapt to the changing political environment. The assumption of responsibility for air defense of the United States gave the Army a role within the New Look. It also resulted in pioneering work in surface-to-air missiles that would evolve into antiballistic missile systems and the development of a variety of tactical missiles capable of delivering nuclear warheads.

Even though the conventional forces developed more slowly during the 1950s than senior Army leaders might have liked, the Army remained a viable fighting force. The bitter experience in Korea left Army leaders determined to maintain a minimum standard of readiness. New items of equipment slowly entered the inventory. Army aviation offered the promise of greatly improved battlefield mobility.

As the new decade began, the Cold War tensions with the Soviet Union showed no signs of abating. The concept of massive retaliation, however, did change. The new President, John F. Kennedy, was a firm believer in the flexible response. To demonstrate his commitment to changing the defense policy, Kennedy brought Maxwell Taylor into his administration, following Taylor's published criticisms of the New Look. With the close of the Eisenhower administration, the era of the New Look also came to an end.

During this time, all of the themes discussed next in Chapter 5 were reflected in the history of the Army, but in different ways. The incorporation of continental air defense marked a conspicuous role for the Army in strategic nuclear warfare. In addition, the Army continued to provide conventional ground forces that were primarily structured to combat Warsaw Pact forces. Although not as large as Army leaders would have liked, these forces were larger and better

equipped than the Army of the 1930s, mostly out of a concern over Communist conventional force capabilities, which included both the Warsaw Pact and the growth of communism in Asia. To enhance its conventional forces, the Army maintained its training and readiness under the CONARC, using the associated themes of Army schools and operational forces. The technical services were responsible for providing technological and materiel superiority, incorporating the themes of basic research, materiel development, and wholesale logistics. The themes of command, control, communications, and intelligence were apparent in the modernization of the Signal Corps.

4.2 FROM KENNEDY TO NIXON AND THE VIETNAM ERA

President Kennedy's commitment to a flexible response that emphasized conventional forces provided an increased role for the Army in United States defense policy. In time, NATO allies adopted the flexible response as its strategy, planning to counter Soviet non nuclear aggression with nonnuclear forces using nuclear weapons only as a last resort.

During the Kennedy and Johnson years, the United States became increasingly committed to the defense of the South Vietnamese government, beginning with a small advisory role that grew to the large-scale commitment of ground combat forces. The philosophy behind the build-up was an effort to contain the spread of global communism. Despite military successes, the United States could not find a viable government in Saigon, so military victories were of little value. The war dragged on, becoming one of the longest, bloodiest, and most divisive wars in United States history. In 1973, the United States withdrew its forces from Vietnam, and the South Vietnamese government fell two years later.

Air defense missions continued with the development of Nike Hercules missiles. Because of the threat of Soviet missiles, air defense also expanded to include the preliminary ballistic missile defenses. For both political and technical reasons, ballistic missile defense never achieved its potential. Only one missile defense site became operational and it closed a short time later.

In 1962, the Army underwent one of the most significant reorganizations in its history. The technical services were abolished, and their functions were assigned to new agencies, including the Strategic Communications Command and the Military Traffic Management and Terminal Service. The most important of the new agencies was the Army Materiel Command (AMC), which consolidated the wholesale logistical functions of the technical services and reorganized them along functional lines. Because the Vietnam conflict consumed a large portion of the Army's money and other resources, materiel development proceeded slowly during the late 1960s and early 1970s.

4.2.1 The Kennedy Administration and the North Atlantic Treaty Organization's Acceptance of the Flexible Response

John F. Kennedy came into office in 1961 strongly committed to improving the nation's military defenses. He had campaigned against the alleged deficiency in ICBMs, the so-called "missile gap." As President, he was determined to continue the United States role as the leader of the noncommunist world, or in Kennedy's words to "pay any price, bear any burden, meet any hardship, support any friend, oppose any foe to assure the survival and the success of liberty."

At the beginning of the Kennedy era, the U.S. Army reflected the global commitments of the nation. More than half of its fighting strength was deployed overseas, with the bulk of these commitments (five divisions) protecting West Germany as part of the NATO alliance. Two other divisions remained in Korea following the armistice. The Army kept its strategic reserve forces within the United States, intending to deploy these units as necessary. Three divisions belonged to a Strategic Army Corps (STRAC) that was advertised as being in the highest state of readiness.

Kennedy appointed Maxwell Taylor as the Chairman of the Joint Chiefs of Staff. In this position, Taylor advocated a "Flexible Response" strategy which would provide the United States with a number of options other than all-out nuclear war. Implementation of the Flexible Response strategy began with a reappraisal of the NATO military policy. The supposed guarantee of United States nuclear weapons had provided a measure of security to Europe. Western Europe thrived under the comparatively inexpensive protection of the nuclear umbrella. The Kennedy administration efforts to shift NATO's emphasis toward conventional forces initially produced skepticism, followed by a change in military strategy.

One justification for the reliance on nuclear forces, especially strategic nuclear forces, was the communists' supposed superiority in conventional forces. In addition to an impressive Soviet military, the eastern European nations were joined in the Warsaw Pact alliance. Depending upon intelligence estimates, the Soviet Army was believed to contain about 150 divisions, compared to between 11 and 16 United States divisions. NATO allies also provided a substantial quantity of ground forces, but even the combination of United States and western European armies did not approach the number of divisions in the Warsaw Pact.

Doubtful of this method of calculation, Secretary of Defense, Robert McNamara, insisted on a more dynamic method of comparing Warsaw Pact to NATO strength. He directed his intelligence analysts to consider such factors as the numerical strength of Soviet divisions, reliance on reserve components, quality of equipment, state of logistical support, and related issues. Here the Warsaw Pact forces looked less formidable, for the Soviet divisions were typically under strength. Their equipment was generally less sophisticated than NATO's and their lean logistical structure was likely to reduce combat readiness further. As a result of the change in analysis, McNamara and his colleagues concluded that the actual fighting capabilities of the communist nations and NATO were at much closer levels than a simple counting of divisions might indicate. If the United States and its NATO allies devoted the money to improving their conventional forces, they might be able to expect to confront the Warsaw Pact forces without a nuclear holocaust.[35]

For the remainder of the Cold War, the Army would seek to provide sufficient forces that, when combined with other services and NATO allies, could deter or defeat Warsaw Pact aggression without all-out nuclear warfare. Calculating the adequacy of NATO forces proved to be a complicated process. Estimates of Warsaw Pact capabilities could vary depending upon the level of Soviet military spending and the methodology and inclinations of the intelligence analysts. The readiness of NATO forces was also subjective. Potential participation of France, which had withdrawn from the integrated command structure but remained in NATO, further complicated NATO calculations. The existence of low-yield tactical nuclear weapons presented more unanswered questions about a possible war in Europe. Would NATO use tactical nuclear weapons to avoid imminent defeat? Would such use lead to total nuclear war?[36]

In 1968, the Soviet Union again used its military to suppress a democratic movement in eastern Europe. This time it invaded Czechoslovakia and re-established a communist regime, but without the extensive bloodshed of the 1956 suppression of the Hungarian revolt. For both the Soviets and NATO, this invasion highlighted further complications of the strategic balance. Western nations were concerned over the Soviet insistence on dominating its neighbors by force if necessary. For the Soviets, however, the incident pointed to one of the greatest weaknesses of the Warsaw Pact. In the event of a war with the west, would the eastern European nations prove to be unreliable allies?

Fortunately questions about the strategic balance remained unanswered. Despite the frequent tensions between Warsaw Pact and NATO nations, the Cold War in Europe did not result in armed conflict.

For the Army within the continental United States, the renewed emphasis upon conventional forces produced a welcome interest in its capabilities. Implementating the flexible response strategy required that the Army be capable of confronting Warsaw Pact armies with the requisite improvements in size and quality. The themes of operational forces, Army schools, and materiel development all received new emphasis.

4.2.2 The Kennedy Administration's Crises

Confrontations with the Soviet Union punctuated the Kennedy administration. The most significant of these involved the futures of Germany and Cuba. This section will cover first the Berlin Crisis and then the two crises related to Cuba.

Following the unsuccessful Berlin blockade of 1948 and 1949, the Soviets accepted the four-party division of the city. Afterwards, however, the city was actually only divided into two parts as the Americans, British, and French merged their zones to create the city of West Berlin. For the East German government, this western enclave within the heart of its territory created a serious problem, as thousands of Berliners took advantage of the open access to flee from communist control. Despite protestations from the Soviet and East German governments, the situation continued.

In August 1961, the East German government decided to stop the flow of refugees by erecting the Berlin Wall. The United States and its allies responded with a variety of symbolic acts designed to protect American prerogatives. These included dispatching Army forces to West

Berlin, followed by conspicuous demonstrations of the American Army. In time the crisis faded, as Berliners reluctantly accepted the presence of the barrier. The Berlin Wall symbolized and remained a constant reminder of the Cold War in Europe.

Kennedy's other confrontations with the Soviet Union resulted from Fidel Castro's rise to power in Cuba and Castro's drifting towards a close relationship with the Soviet Union starting in 1959. Toward the closing days of the Eisenhower administration, the Central Intelligence Agency (CIA) plotted with Cuban exiles to organize an invasion of Cuba at the Bay of Pigs. The affair proved to be a disastrously ill-conceived adventure, as the invaders lacked military power or popular support. They were easily defeated at the beachheads. The affair was a blow to the United States' prestige.

Following the Bay of Pigs, the Soviet Union attempted to introduce intermediate range missiles into Cuba. Upon discovery of the missile sites, Kennedy initiated one of the most dramatic actions of the Cold War when he directed the Navy to intercept Soviet ships headed for Cuba. If the Naval efforts were successful, the Army and Marine Corps, with Navy and Air Force support, were to invade Cuba. The Army commenced preparations for the invasion by redeploying its units, and coordinating with the Navy for the assault. Although the Navy was successful, the Army and Marine Corps did not have to invade because, after several tense days, the crisis passed when the Soviet Union agreed to dismantle it missiles.[37]

For the Army, the Berlin Crisis and the Cuban missile crisis emphasized the need for adequate conventional forces. Both situations required a military response to Soviet advances, but not nuclear warfare. In their view, the ground and naval superiority in the vicinity of Cuba was as important as nuclear capability. Because the United States could win a conventional war in Cuba, the Soviet Union would be forced to choose between nuclear war or backing down.

4.2.3 Beginnings of American Involvement in Vietnam

During his first year in office, following the assassination of President Kennedy in November 1963, Lyndon Johnson increased the United States' involvement in the conflict in Vietnam. Believing that future communist expansion would occur through wars in developing nations and that the communist versus anticommunist paradigm that had worked in Europe could be applied globally, the United States committed its forces to extended fighting in Vietnam.[38]

The conflict had its origins in the division of Vietnam following the ejection of the French Colonial Government in 1954. Ho Chi Minh, a communist who had a considerable popular following, ruled the northern half of Vietnam, while Ngo Dinh Diem, an ineffective but pro-western figure, was president of the southern half, with its capital in Saigon. Although the country was divided at the 17th parallel, elections were planned to decide the nation's future, but were never held. In the following years, popular support of the Diem government steadily eroded until a communist-supported insurgency, known as the Viet Cong threatened to destroy it.

Alarmed at the possibility of a communist success and fearing that the loss of South Vietnam would lead other Asian nations to fall to the communists like a row of dominoes, the United States overlooked the weakness of the Saigon government and increased its miliary commitments. At the same time, the North Vietnamese government increased its support for the

insurgency, sending regular North Vietnamese Army (NVA) units to the south. A confused naval incident in the Gulf of Tonkin in August 1964 heightened the tensions and resulted in a congressional declaration of support for American intervention.

By 1965, the cycle of mutual escalation began in earnest. Instead of limiting its support to advisors, the United States committed Army and Marine Corps ground combat forces to engage the enemy directly accompanied by a sustained bombing of North Vietnam. In response, the North Vietnamese government increased military involvement in the South. To supply the combat force, the Army deployed an enormous supporting structure, including supply, transportation, maintenance, signal, engineer, and administrative units.

Within the United States, mobilization for the conflict was gradual but significant. As the strength of the Army increased, training programs were expanded. The existence of cantonment structures, many dating from World War II, precluded the need to construct significant new training facilities for ground forces. Most construction for training was developed for special purposes. Many installations built mock-ups of Vietnamese villages as training devices, and helicopter pilot training expanded. Army logistical and industrial installations experienced substantial renovation and improvement. The many GOCO ammunition plants were reopened and renovated to meet the requirements for the fighting.

Initially, American combat operations in Vietnam appeared successful, with American superiority in firepower producing frequent tactical victories. The helicopter demonstrated its potential for moving and supporting ground combat forces and Army aviation became a critical factor in the fighting. In remote regions, the Special Forces (Green Berets) gained a measure of fame as they worked to organize local tribes to fight the communists.

Yet, as the conflict continued, a final victory remained elusive. In January 1968, the communist staged a series of surprise attacks, known as the Tet offensive. Although the attacks were a tactical failure, they demonstrated the ability of insurgents to move freely among the population. Within the United States, opposition to the war increased dramatically after the Tet offensive. The inexorably rising casualties and the lack of a victory made the whole effort seem futile. Americans increasingly doubted that South Vietnam was essential to the defense against global communism. Opposition to the war caused Lyndon Jonson to decide against seeking reelection and produced large-scale protests, often violent, during Richard Nixon's first term as president.

In January 1973, Richard Nixon negotiated an agreement that appeared to provide an honorable exit from the war. American prisoners-of-war were returned. The United States withdrew its forces, while both the communists and South Vietnamese forces remained in place until the nation's future could be resolved. Within two years, however, the communist initiated a final offensive that resulted in the rapid collapse of the Saigon government. America's longest war had ended with a communist victory.

4.2.4 Effects of the Vietnam Conflict Upon the Army

The U.S. Army entered the Vietnam conflict during the 1960s with confident expectations of victory and emerged seven years later seriously damaged. The war's unpopularity translated

into a general hostility towards the military, with the Army suffering heavily.

Among the more noticeable results of the changed atmosphere was the end to the draft, followed by the introduction of the all-volunteer Army. Although the volunteer Army eventually proved to be a success, it was plagued with difficulties during the early years. The end of the draft also accelerated the integration of women into the Army, as the personnel requirements caused the Army to turn to women in increasing numbers.[39]

The years of fighting and the bitter divisions surrounding the conflict left the Army in poor shape for fighting any wars outside of southeast Asia. Money that might have been used for materiel readiness such as replacement parts or new equipment was spent on the war. To meet the personnel requirements for Vietnam, the Army understaffed other units. In 1970, the Assistant Vice Chief of Staff, William DePuy, commented that the Army could not put one full-strength corps into the field outside of Southeast Asia. Units were critically short of strength in Europe, and machinery was inoperable because of lack of funding for maintenance.[40]

The immediate requirements of the fighting also consumed money that might have been spent on research and development. Weapons systems that were needed for the jungle war received the highest priority, including the Cobra helicopter gunship or other aviation items. Although not entirely neglected, materiel intended for a conventional war generally received a lower priority.

At the installation level, the funding demands led to a lack of new growth. Of course, training installations operated at a higher level because of the war, and some production facilities, such as ammunition plants, were used to sustain the fighting. Yet money for large-scale capital improvements was not available during the war. In the years following the war, this neglect would be followed by a remarkable surge in spending, especially for materiel development.

The Vietnam era also marked the end of the American perception of a monolithic communist block. For many reasons, including disillusionment with the war, and a growing Sino-Soviet quarrel, more Americans came to understand that nationalist interests were also important to understanding communist nations, and that Asian communists should not be viewed as extensions of Soviet communism.

4.2.5. Army Organization During the 1960s

Even though the Vietnam conflict dominated the Army's operations during the 1960s, all previous commitments remained active to some degree. The Army continued to provide forces to support NATO, to defend Korea, and to provide forces for a strategic reserve. Air defense of the continental United States remained an important mission that even expanded with the development of ballistic missile defense systems.

NATO treaty obligations remained in effect, despite the heavy troop deployments to Vietnam. Yet the pressures of Vietnam led to reductions in the numbers of soldiers in Europe. Moreover, these reductions came at a time when the European nations were gradually coming to accept the concept of flexible response instead of massive nuclear war.

All U.S. forces in Europe came under the United States European Command (EUCOM), which was a joint (all service) command, normally commanded by the Supreme Allied Commander, Europe. The Army forces were designated the United States Army Europe (USAREUR) and consisted of the United States Seventh Army, a separate task force for Southern Europe, the Berlin Brigade, and designated logistical forces. The strength of Seventh Army fluctuated, but typically it contained two corps headquarters, for a total of four or more divisions; the logistical support structure; and considerable missile and tactical nuclear capabilities.[41] U.S. forces remained stationed at former German military installations and facilities, which were upgraded to meet modern needs.

To meet NATO commitments under these circumstances, the United States formulated a policy of making U.S.-based forces available to immediately reinforce forces in Europe. To accomplish this end, heavy equipment was prepositioned in Europe so that units could be airlifted into Europe without the slow process of sea transportation. The first experiment in this direction came with Exercise BIG LIFT, when the 2nd Armored Division deployed from Fort Hood to Europe in October 1963. In 1968, the Army withdrew two brigades from Germany, but left the equipment behind. In January 1969, NATO conducted the first REFORGER exercise as these units returned to withdraw their equipment from storage sites, train in Germany, and then fly back to the United States. From that point forward, REFORGER exercises would be a critical component of NATO, as the United States demonstrated its ability to use airlift and prepositioned equipment to rapidly re-inforce NATO.[42]

In Korea, the Army maintained two divisions until Fiscal Year 71. At that time, the 7th Infantry Division was deactivated, leaving only the 2nd Infantry Division. In 1971, the Korean Army assumed greater responsibility for patrolling the demilitarized zone, separating the North and South. Interestingly, the United States provided forces to defend South Korea at the same time that South Korea was providing troops to assist in Vietnam. Elsewhere in the Pacific, the Army maintained logistical units in Japan and a deployable reserve in Hawaii in response to potential Soviet threats.[43]

Although it is one of the 50 States, Alaska was considered overseas duty, and Army forces in Alaska came under the control of a joint command. As of 1967, the Army maintained the equivalent of one division in Alaska. Its principal mission was to protect and support the Air Force installations, especially by providing air defense. The ground units were responsible for defending the vast and inhospitable terrain against possible Soviet attack from across the Bering Straits. Here the Army relied upon selected Alaskan National Guard units, composed principally of Eskimos, to scout the terrain.[44]

Most Army forces within the continental United States (CONUS) were commanded by CONARC, which was created as a successor to the Army Field Forces in 1955. That command fulfilled most of the missions, except doctrinal development, now performed by today's Forces Command (FORSCOM) and Training and Doctrine Command (TRADOC). These missions included responsibility for all schools and training within the United States. Until 1962, the technical services maintained their own education system. With their termination, these schools became a part of CONARC.

CONARC had command of the deployable forces within the United States. These units

were the Army's strategic reserve. Based in the United States, they were to be trained and ready to deploy anywhere in the world. The quantity of units committed to the strategic reserve varied. In 1967, it included eight divisions, plus supporting artillery, logistical, and other units. These operational forces were preserved to keep NATO treaty commitments, to counter communist aggression, or otherwise protect American interests. These forces and the forces already deployed overseas were the focal point of all training and logistical efforts.

The 82nd Airborne Division, based at Fort Bragg, North Carolina, generally served as the first unit on a deployment plan. The importance of this division to Army planning highlighted an advantage of the airborne infantry during an era of global commitments, which was its strategic mobility. During World War II, parachute units were valued for their ability to drop behind enemy lines. During the Cold War they were valued principally for their ability to move across the world by air. All of an airborne unit's equipment was light enough to be moved by the Air Force, and the units could either land at a friendly airfield or jump into the target area.

Smaller commands completed the Army structure. The Combat Developments Command was created to assume responsibility for Army doctrine. The Army Intelligence Command, also created in 1965, consolidated the Army's intelligence and counter-intelligence responsibilities. The roles of the AMC, Army Air Defense Command, Strategic Communications Command, and Military Traffic and Terminal Service will be discussed in later sections.[45]

The Army also restructured its divisions into what was termed the Reorganization Objective Army Division (ROAD), to provide a more flexible form of command. The new division was organized into brigades, which were composed of armor or infantry, and the supporting artillery, logistical, and other units.

4.2.6 Communications, Intelligence, and Transportation

The global commitments of the Army during the Cold War era highlighted the importance of adequate communications and transportation networks. These requirements included strategic communications or transportation systems that could support the Army or other forces throughout the world and tactical systems that were designed for use within a theater of operations. Although perhaps less noticeable than combat forces, communications and transportation functions were also necessary to the total Army capabilities.

Traditionally, communications and transportation functions were managed by the Chief Signal Officer and the Chief of Transportation, who were part of the technical services. With the 1962 reorganization of the Army came changes in its communications and transportation systems.

In 1964, the Army created the new Strategic Communications Command to operate all of the Army's strategic communications systems throughout the globe. In 1973, the organization became the Army Communications Command to reflect its responsibilities for managing all Army communications.

With regard to ground transportation management, the Department of Defense experimented with a number of arrangements until it created of the Military Traffic Management and Terminal Service (MTMTS) in 1965. The new agency had two primary responsibilities:

coordinating overland transportation of goods, primarily through commercial sources and operation of the Army's ocean ports. Although the name changed to Military Traffic Management Command (MTMC) in 1974, its mission has remained basically unchanged since 1965.[46]

The ability to move personnel and supplies to Europe was essential to a credible NATO strategy and required coordination between the Army, Air Force, and Navy. To provide immediate reinforcements for NATO, the United States relied upon pre-positioned equipment so that designated units could be airlifted to Europe and operational within a short time. This scenario was practiced during the annual REFORGER exercises.

Sustained combat, however, required moving follow-on forces to Europe. Follow-on forces were defined as all units expected to move to a theater of operations after the initial airlift. They included both combat and logistical units from the active Army and its reserve components. Planning to reinforce Europe called for active units that would deploy from their home stations, such as Fort Hood, Fort Campbell, Fort Polk, or any other post where units were stationed. Personnel would be transported by the Air Force. Equipment would move by sea. Reserve component units would assemble at an armory or reserve center, then train at a nearby post before deployment. Like the active component units, the personnel would move by air and the equipment by sea. The Army also planned to ship quantities of replacement equipment by sea.

Although the Army planned to use commercial sea ports, it also maintained its own network of ocean terminals. On the east coast, the Bayonne, New Jersey, terminal was designed for shipments of general cargo, while the Sunny Point, North Carolina, terminal was specially designed to move large quantities of ammunition and explosives. The Oakland, California, port was maintained to move general cargo on the west coast. To operate ports in the United States and abroad, the Army trained stevedores and other port specialists at Fort Eustis, Virginia.

The Army's intelligence community also changed during the 1960s, but in different ways. Recognizing the requirement for greater professionalism in intelligence work, the Army directed the establishment of Military Intelligence as a separate career branch for the regular Army in 1962. This change meant that intelligence specialists would remain in their career field, receive continuing branch-related education, and be recognized as specialists. The Intelligence School remained at Fort Holabird, Maryland, until its transfer to Fort Huachuca, Arizona, in 1971.[47]

Essentially, these years resulted in changes in organization while the themes of communications, intelligence, and transportation remained part of the Army's posture.

4.2.7 Continental Air Defense and Antiballistic Missiles

Throughout the 1960s, the threat of a nuclear war with the Soviet Union remained a major concern for the Department of Defense. In response, the Army maintained the Army Air Defense Command as a part of the joint Continental Air Defense Command. The increasing threat of ballistic missiles caused the Army to move beyond its familiar antiaircraft missiles to experiments with ABMs.

For research and experimentation with its missile defense systems, the Army improved its

equipment and facilities at the Kwajalein Atoll. During the 1960s, the Army used the islands for testing Army missiles shooting at incoming ICBMs. Project Mudflap, an experiment using the Nike-Zeus in an antisatellite role, also relied upon the facilities at Kwajalein. The radar and tracking facilities were used in support of the Air Force ICBM testing in the Pacific, resulting in an average of 60 to 70 missiles aimed at Kwajalein annually. Until 1962, the Army operated the tracking stations, but the Navy provided overall administration of the island. In 1962, administrative control of Kwajalein transferred to the Army. White Sands Proving Ground, New Mexico, provided a smaller missile range within the United States.

Any decision to deploy an ABM system carried political implications. Robert McNamara strongly believed that an ABM system would only serve to escalate the nuclear arms race; both the superpowers would increase their nuclear arsenals to overcome the defensive systems. Yet the idea of a ballistic missile defense carried its own bureaucratic momentum.

In 1967, McNamara announced that the Army would develop and deploy a light ABM system, designated the Sentinel. It was too small to defend the United States against a Soviet attack, so McNamara stated that the Sentinel system would be used primarily against a possible Chinese attack. During the closing years of the Johnson administration, the Sentinel came under increasing criticism. Although this system did not become operational, the technology was incorporated into the Safeguard system.[48]

At the beginning of his administration, Richard Nixon restructured the ABM program, and renamed the Army's ABM system Safeguard. Unlike its predecessors, the Safeguard actually became operational, if only for a short time. The new system was not designed to protect cities; instead it was to defend Air Force missile silos and was based in the northern Great Plains. The Army constructed a single site at Grand Forks, North Dakota, and announced its operational status in 1975.[49]

At this time, both the Soviet Union and the United States concluded that further development of ballistic missile defenses would only lead to an accelerated arms race for offensive weapons. In a mutual effort to reduce tensions, known as detente, both sides negotiated limitations on strategic weapons systems. As part of the process, the United States and the Soviet Union ratified an ABM treaty that limited both nations to two ABM sites. In 1973, Congress further restricted the Army's ABM development to the single site at Grand Forks, North Dakota.

The site's location near many of the Air Force missile silos was intended to protect at least some of the Air Force missiles, preserving a deterrent capability. The following year, the Soviet Union and the United States signed a protocol limiting both nations to one ABM site. In 1975, five months after becoming operational, the Grand Forks site was closed. The Army Air Defense Command was deactivated. Until the Reagan administration, the ballistic missile defense program was limited to research work, which was managed by the Missile Command at Redstone Arsenal and conducted through both Government facilities and contractors.[50]

By the close of this era, the Grand Forks ABM site contributed to the theme of ballistic missile defense.

4.2.8 Materiel Readiness

The Army's logistics changed dramatically during the 1960s, as Robert McNamara directed one of the most significant reorganizations within the history of the Army. The technical services were terminated as operational organizations, remaining only as career fields for Army personnel. The logistical functions of the Army were transformed to a new organization, AMC. From its headquarters in Alexandria, Virginia, AMC provided integrated materiel management, including developing new products, managing stocks on hand, and providing maintenance and technical support. AMC has continued to perform these functions to this day.

The new command was divided into subordinate commands primarily organized by commodity. The initial structure included the Electronics Command (headquartered at Fort Monmouth, NJ), Munitions Command (headquartered at Picatinny Arsenal, NJ), Weapons Command (headquartered at Rock Island Arsenal, IL), Mobility Command (headquartered at Detroit Arsenal, MI), and the Missile Command (headquartered at Redstone Arsenal, AL). Two commands performed functions that incorporated the full spectrum of commodities. The Test and Evaluation Command (headquartered at Aberdeen Proving Ground, MD) assumed responsibility for acceptance testing of all new products within the Army inventory. The Supply and Maintenance Command (located at AMC headquarters in Alexandria, VA) assumed responsibility for managing both supply and maintenance functions, including inventory control. Since its creation, AMC has undergone numerous reorganizations of its subordinate commands, including a temporary name change to Development and Readiness Command (DARCOM) from 1976 to 1984.

The establishment of AMC also altered the command structure for installations that had been under the control of the technical services. As noted earlier, each of the technical services managed its own network of facilities, including schools, laboratories, depots, proving grounds, and some production facilities. The Ordnance Department had maintained the largest such network and, following the reorganization, most AMC installations were connected to the production of weapons and ammunition.

The concurrent creation of the Defense Supply Agency (DSA) also affected the Army's supply system. As part of the reorganization, DSA managed items used by more than one service, including selected supply depots. Responsibility for operating installations such as the Richmond Quartermaster Depot was transferred to DSA, although the Department of the Army still owned the property.[51]

Nevertheless, the Army retained a substantial network of depots, most of which dated from World War II. Initially, the depots reported to the Supply and Maintenance Command (SMC), but with the merger of SMC into AMC headquarters in 1966, the depots reported directly to AMC headquarters. In 1976, AMC established a Depot Systems Command (DESCOM) to provide centralized management of Army depots. Throughout the Cold War era many Army depots gradually shifted their emphasis from storage to complete equipment overhaul. Letterkenny Depot became a center for completly overhauling vehicles, while Tobyhanna depot developed sophisticated facilities repair and overhaul electronics equipment.

The network of arsenals and GOCO production facilities were organized under the Weapons or Munitions Commands. Throughout the various reorganizations of AMC, the

reporting structure for these facilities changed accordingly. Many of the GOCO factories, such as Ravenna Army Ammunition Plant, remained in a caretaker status, with few changes or even little maintenance since World War II. Others remained active production facilities and were constantly renovated. The demands for ammunition caused by the Vietnam conflict stimulated considerable renovation of ammunition plants. Production lines were updated, and new buildings were added. Mississippi Army Ammunition Plant, which was established in 1978 to produce improved 155mm ammunition, was the only new GOCO ammunition plant constructed during the Cold War.[52]

Many of the former Ordnance Department arsenals gradually shifted from production to research and development functions or were closed. In 1964, McNamara announced a decision to close the old Watertown Arsenal, but later the installation became the U.S. Army Materials Research Agency. Picatinny Arsenal became the headquarters for the new Munitions Command while continuing to be used for research and to produce limited amounts of large caliber ammunition. Frankford Arsenal, also a part of the Munitions Command, became a research and development center, specializing in fire control and guidance systems until its closure in 1977. Edgewood Arsenal, also a part of the Munitions Command, specialized in Chemical Warfare. Rock Island Arsenal served as headquarters for the Weapons Command, as well as an engineering center for ordnance production, typically developing processes for private contractors. Watervliet Arsenal, another Weapons Command installation, remained the Army's principal production facility for artillery tubes, a role that became ever more important with the Vietnam conflict. The opening of the Benet Laboratories in 1962 highlighted the increasing significance of research work. Springfield Armory was the Weapons Command center for small arms until its closure in 1968. Its functions were transferred to Rock Island Arsenal. Although the tank production lines at Detroit Arsenal were inactive, it served as headquarters for the Mobility Command.[53]

Research facilities within AMC were divided into two categories, basic research and materiel development research. In theory, basic research applied to militarily useful technologies that affected two or more commodity commands. The purpose of basic research was not so much to produce new items of materiel as to conduct research that could be applied later. Product development was the responsibility of the commodity commands (e.g., Weapons Command, Munitions Command, Electronics Command).

The Army considered basic research essential for its long-term success in the Cold War. By investing in technologies that might be applicable during the following decades, Army leaders hoped to maintain superiority in equipment to compensate for Warsaw Pact superiority in numbers. Initially, the basic research function was assigned to "corporate laboratories" under the direction of AMC headquarters. The Research, Development, and Engineering (RDE) centers with in-house research capabilities focused upon developing specific products. For example, the Natick RDE center used its special climatic chambers to design clothing for arctic climates. The electro-optical RDE facilities at Fort Belvoir provided the night vision components for a wide variety of Army equipment. Other RDE centers contracted out their requirements to the private sector.

Responsibility for equipment evaluation was consolidated into the new Testing and Evaluation Command (TECOM). Headquartered at Aberdeen Proving Ground, the new command performed the technical evaluation of new products to ensure that they met the specified characteristics. As the Army acquired increasingly sophisticated equipment, the challenges of

developing appropriate testing equipment and methodologies increased correspondingly. TECOM's first accomplishments included preparing a standardized data management system to manage new tests and writing new manuals to ensure uniform testing procedures. In 1965, the Army Chief of Staff directed that the TECOM commander certify the technical suitability of all new systems entering the Army inventory.[54]

One of the early results of the reorganization of the technical services was a consolidation of installations. At its creation, AMC possessed 122 installations and 158 activities, including deports, arsenals, ammunition production factories, laboratories, and test facilities. Most of the buildings dated from World War II or earlier. AMC headquarters began to develop a master plan for improving and consolidating the installations, although funding uncertainties caused by the Vietnam conflict complicated the task. By 1968, AMC had consolidated its functions into 86 installations and 119 activities.[55]

Throughout the Cold War era, the process of materiel acquisition had become increasingly complicated and decentralized. Once decision to develop a new major weapons system was approved, multiple installations and activities were involved in the design process. Any new system contained several subsystems (such as electronics, weapons, and engines) and components, each designed or tested by a separate activity. Although the process allowed the Army to obtain sophisticated equipment, it complicated the procurement process and resulted in lengthy procurement times.

The tube launched, optically tracked, wire guided (TOW) antitank missile was one of the most important new systems produced during the 1960s. Its development illustrates the increasing complexity of the procurement process. The TOW was one of the first precision guided munitions to be produced primarily for use against Warsaw Pact tanks. Essentially, it was guided by a computer that tracked the missile and gave course corrections to the missile through a wire that unspooled while the missile was in flight. As long as the American soldier kept the target in his cross hairs, the TOW could hit a moving target at distances from 2,000 to 3,000 meters.

At least 12 activities played some role in the development or design of the new weapon. The Missile Command (MICOM) at Redstone Arsenal was the lead agency for the TOW, and much of the planning and developmental work was performed at that installation. The Ballistic Research Laboratory at Aberdeen Proving Ground also performed important developmental work. The night sight, an essential component because of the increasing importance of night combat, was developed at the Electronics Command's Night Vision Laboratories, Fort Belvoir. Hughes Aircraft was responsible for the overall design of the missile, but many of the key components came from Army production facilities, including the tactical warhead (Iowa Army Ammunition Plant); the flight motor and igniter (Radford Army Ammunition Plant), and the launch motor and igniter (Picatinny Arsenal). White Sands Missile Range served as executive agency for all testing, but specialized tests were conducted at other TECOM installations, including Aberdeen Proving Ground, Maryland (vehicle and warhead), Fort Clayton, Panama (tropic environment), Fort Greely, Alaska (arctic environment), and Yuma Proving Ground, (desert environment). Testing for airdrop and air transportability suitability was conducted at Fort Bragg, North Carolina. The Infantry Board, at Fort Benning, supervised the simulated combat tests by soldiers. Altogether the process required about 11 years from the time the

concept was first discussed to production of the weapon.[56]

This weapon's development illustrates the increasing decentralization of materiel production and the emergence of systems that required the interdependence of installations.

4.2.9 Chemical Warfare

During the early 1960s, the United States continued to maintain and produce chemical and biological agents. Most of the chemical agents were stored in bulk containers, instead of being loaded into munitions. The preservation of a chemical warfare capability was justified as a deterrent to the communist block's use of chemical weapons.

With the creation of the Army Materiel Command, responsibility for chemical weapons was assigned to the Army Munitions Command, the same organization responsible for producing conventional ammunition. The network of installations in existence for the Chemical Corps was subsequently transferred to the Munitions Command. Edgewood Arsenal was the site for research and development of chemical weapons, while Fort Detrick played that role for biological agents. Pine Bluff and Rocky Mountain Arsenals were the Army's production facilities, and Tooele Depot was a storage installation for chemical agents. Dugway Proving Ground became a part of the TECOM.

In 1968, an accident near the Army's chemical testing facilities at Dugway Proving Ground resulted in the death of nearby sheep. President Nixon ordered a comprehensive review of the chemical warfare programs that ended the production of chemicals and research in biological warfare. The United States preserved its existing stockpiles of chemicals, but biological agents were destroyed. Future efforts were limited to defensive equipment, such as protective masks, clothing, and protection for vehicle crews, which were developed in partnerships with the Army and private industry. As part of the temporary decline in interest concerning chemical warfare, the Army closed its Chemical School in 1972, and the school remained closed until it was reactivated at Fort McClellan in 1980 in response to indications that the Soviets were expanding their chemical warfare capabilities.[57]

Changes in chemical warfare are illustrated in the themes of materiel development and the Army School System.

4.2.10 The Close of the Vietnam Era

From the beginning of the Kennedy administration to the final withdrawal from Vietnam, the Army underwent numerous changes. The era began with President Kennedy's enthusiastic support of the flexible response concept. He supported increased funding for conventional forces, especially the Army, with the expectation of finding an alternative between massive nuclear war and incremental gains by the communist nations. The presence of Army units during the 1962 Berlin crisis served as a visible reminder of the United States' resolve to defend western Europe.

Yet as the flexible response was increasingly executed through counter-insurgency in Vietnam, the Army entered the most frustrating and divisive war in its history. Determined to prevent communist expansion, the United States supported a series of unstable Saigon

governments. With steadily increasing casualty figures and no victory in sight, popular opinion within the United States turned against both the war and the military. In addition to a loss of popular support, the war drained resources that might have been used to support its other missions in Europe, Korea, and elsewhere.

Nonetheless, the United States maintained its commitments to Europe and Korea, although the fighting capabilities of units in these theaters were questionable. Even though actual fighting did not occur in these theaters, the presence of communist forces was real, creating a perceived need for a United States presence. As the Army recovered from the effects of Vietnam, it would return its focus toward conventional war, especially in Europe. Once again, it would seek to provide a deterrent to communist aggression short of strategic nuclear weapons.

Despite the turbulence created by the Vietnam conflict, the Army completed one of the most comprehensive reorganizations in its history. The long tradition of independent technical services ended with the creation of the AMC. The new command provided consolidated and integrated management of the Army's wholesale logistical system. AMC has remained the Army's single logistical command, in spite of its numerous internal reorganizations.

Changes during these years affected basic research, materiel development, wholesale logistics, Army schools, and operational forces.

4.3 FROM VIETNAM TO THE CLOSE OF THE COLD WAR

The Army's experience in Vietnam had left it poorly prepared for future combat operations. The war's unpopularity led to the end of the draft and created problems in recruiting quality personnel. The lack of money for materiel development created problems with equipment readiness and modernization. At approximately the same time, the Soviet Union improved its Army, both in quantity and quality, making it a more formidable foe in a conventional war.

Army leaders responded by restructuring and rebuilding the Army. In 1973, the Army created two separate commands, one for existing forces and one for training. The change led to greater emphasis upon training forces in peacetime, including the establishment of a National Training Center at Fort Irwin, California. The Army adopted a new fighting doctrine, known as AirLand Battle, which emphasized rapid maneuver and close coordination between air and ground forces.

Equipment problems were resolved with an unprecedented move toward materiel modernization. In a trend that began during the closing years of the Ford administration, accelerated under President Carter, and peaked under President Reagan, the Army introduced new types of equipment for almost all of its major weapons systems, as well as new communications and logistical equipment.

Under President Reagan, the Army played a role in the work associated with the development of the Strategic Defense Initiative (SDI), also known as "star wars." In conjunction with the other services, the Army contributed to work on a space-based ballistic missile defense, especially through the use of its facilities at Kwajalein Atoll. However, the SDI remained in the research and development phase and never reached production.

After 50 years of confrontation between the communist and western powers, the Cold War ended with surprising speed. Wishing to improve his nation's economy, Soviet leader Mikhail Gorbachev instituted a series of reforms that could not be reversed. As the momentum of communist reforms accelerated, the communist block structure fell. In 1989, the German city of Berlin was reunited with the destruction of the Berlin Wall. The event marked the symbolic end of the Cold War.

4.3.1 The Hollow Army

Combat readiness of all Army units declined seriously during the later days of the Vietnam era. The decline was especially serious in Europe, where the United States' forces in NATO had been allowed to deteriorate to meet the needs of the forces in Vietnam. The United States still kept four divisions, two cavalry regiments, plus supporting forces in Germany, but these forces were in a poor state of readiness. Lack of money for maintenance resulted in inoperable equipment. Units were chronically short of personnel; some squads were down to zero strength. The soldiers assigned to Europe rotated frequently before they became comfortable with their jobs, often with the best soldiers transferred to Vietnam.[58]

The Army's Chief of Staff at the close of the Vietnam war, Creighton Abrams, recognized the problems and set a pace for changing the direction of the Army. With the full support of the Secretary of Defense, James Schlesinger, Abrams initiated programs to integrate modern weapons into the inventory, improve the quality of personnel, and increase the role of the Reserve components. The new emphasis on the Guard and Reserve had two purposes. The Army wanted to avoid the Vietnam experience of fighting a war without mobilization, and using reserve manpower in many of the support functions allowed Abrams to achieve his goal of increasing the number of active Army divisions from 13 to 16 despite drastic reductions in its authorized strength.[59]

The years immediately following the Vietnam conflict presented the Army with some of the greatest challenges in its history. At the same time that the United States' military was recovering from the effects of Vietnam, the Soviet Union embarked on an unprecedented expansion of both its conventional and nuclear forces. For the Army, this expansion resulted in an opponent that had improved significantly in both quantity and quality. Between 1966 and 1980, the number of Soviet tanks increased from 35,000 to 50,000, and the artillery/rocket launchers increased from 11,000 to 40,800. The number of Soviet divisions rose to a peak of 173. More ominously, the Soviets now produced tanks and fighting equipment that approximately equaled the quality of NATO weapons of the same type. Having postponed materiel development during the Vietnam era, the U.S. Army could not easily match the Soviet improvements.[60]

The Soviet Army also expanded its ability to use chemical weapons, especially toxic gases. Despite a 1974 joint communique between the United States and the Soviet Union that renounced chemical warfare, the Soviets strengthened their chemical capability. By 1980, roughly 60,000 Soviet soldiers were designated as chemical specialists, and that number could be expanded in wartime. In October 1973, Israel and several of its Arab neighbors, including Egypt, Jordan, and Syria, engaged in a war, in which intelligence reports indicated that the Arabs were prepared to use chemical weapons which were supplied by the Soviet Union. These reports alarmed NATO

intelligence analysts, who feared that the Warsaw Pact nations would also use toxic gases in the event of a war. By 1975, an Army review concluded that the NATO nations were at a serious disadvantage with regard to chemical warfare.[61]

In an effort to explain this resurgence in Soviet military power, James Schlesinger, who was Secretary of Defense under Presidents Nixon and Ford, concluded that the Soviets were seeking to exert a greater influence on western Europe. He considered the possibility of premeditated invasion as unlikely, but was unwilling to dismiss the buildup as merely defensive. U.S. and western European leaders feared that the strengthened Soviet military could intimidate its neighbors to the detriment of western interests. This growth in Soviet ground power in the late 1960s and early 1970s presented the Army with its greatest challenge of the post-Vietnam era. By this time, the NATO allies had accepted the policy of flexible response in the hope of providing a credible, nonnuclear deterrent to Soviet advances. Even as it was recovering from Vietnam, NATO needed to present a credible fighting force, both to deter the Soviets and to reassure U.S. allies.

The end of the draft, combined with the unpopularity of the Vietnam conflict, discouraged otherwise capable young men from enlisting. The result was serious a decline in the quality and quantity of personnel. Few units were at full strength, and line units found many of their soldiers detailed to installation support duty. Increased racial incidents, drug use, and related discipline problems were part of the problems facing the Army during the immediate post-Vietnam years. In time, aggressive recruiting and economic incentives would produce a highly qualified personnel pool. The requirements for competent soldiers also encouraged the Army to expand the opportunities available for women outside of the combat branches.

By the beginning of the Carter administration in 1977, the situation for the Army began to improve. Carter and his Secretary of Defense, Harold Brown, placed a high priority upon a conventional defense of Europe, especially West Germany. Like their predecessors in the Ford administration, Carter's advisers feared that Warsaw Pact power would enable the Soviets to intimidate western Europe or other noncommunist nations. The Soviets might use their military outside of western Europe. To counter the Soviet military growth, Carter's advisers favored increased appropriations for the Army. Funding went both to improved readiness for existing units and for the beginnings of materiel modernization programs. The latter would pay significant dividends during the 1980s, as the Army brought new equipment into its inventory. Nevertheless, the pace of improvements remained frustratingly slow. Speaking to Congress in 1980, the Chief of Staff, Edward Meyer, warned that inadequate defense funding was creating a "hollow Army," one which had greater strength on paper than in reality. The phrase seemed appropriate to describe the Army of the 1970s.[62]

During the Reagan administration, the trends initiated in the Carter years accelerated. The budgets of the early Reagan years contained significant increases in defense spending, including spending for the Army's major weapons systems. The quality and quantity of recruits improved noticeably. In short, the days of the "hollow Army" became a memory as the U.S. Army became a potent fighting force, capable of confronting the Warsaw Pact buildup.

4.3.2 Army Reorganization

A significant change in the Army's structure came in 1973, when the Army eliminated the CONARC and the Combat Developments Command and replaced them with two new commands, FORSCOM and TRADOC, both commanded by four-star generals. FORSCOM was responsible for all the Army's deployable forces within the continental United States. The forces included the actual fighting units (e.g., divisions, armored cavalry regiments, and separate brigades) and all of the supporting structure that normally functioned within a theater of operations. The FORSCOM commander also commanded Army Reserve units, and he exercised training oversight of Army National Guard units.

General Edward Meyer later described the creation of TRADOC as a new beginning point for the Army's most important peacetime task, that of training both individual soldiers and units. The new command encompassed responsibility for all of the Army's branch schools, initial entry training, the Reserve Officers' Training Corps (ROTC) program, the Command and General Staff College, as well as smaller schools. Each of the schools had three responsibilities: to teach students, to develop training materials, and to develop or contribute to doctrine within their specific areas of responsibility. Soldiers could be taught by resident instruction or through nonresident programs, such as correspondence courses.

TRADOC's responsibilities for writing doctrine included doctrine about how Army units should train. With TRADOC as lead agency, the Army revised its training program during the late 1970s to emphasize specific tasks, especially those related to a unit's mission. Whereas previous Army training practice prescribed the number of hours to be devoted towards particular subjects, the new philosophy emphasized tasks to be learned and standards for each task. Training for both individuals and units was to be structured toward the essential wartime tasks, and the time was adjusted to allow an organization to correct deficiencies.[63]

With the renewed emphasis on training, the Army increased its use of technology both to add realism and to minimize costs. Two of the most important adaptions of technology to training were the Multiple Integrated Laser Engagement System (MILES) and computer simulations. The MILES system featured adapters that enabled a rifle or other weapon to shoot a laser beam, and equipment attached to the soldier to record a hit or miss. Using this equipment, soldiers could conduct realistic training exercises. Later the MILES equipment was adapted to large weapons, such as tanks, to allow better maneuvers for mounted combat. Computers were used to conduct staff exercises by simulating combat conditions and giving a commander and staff the opportunity to practice making decisions and preparing operations orders. Other computers could be used as training devices, such as a system that mimicked the interior of an M-1 tank.[64]

Starting in 1976, the Army tried a new initiative to improve its performance at fighting conventional wars on a broad front. Even the largest installations within the United States lacked space for wide open maneuvers that could enable brigade-size units to maneuver freely. Consequently, the Army reactivated Fort Irwin in the California high desert and designated it as the National Training Center. Here brigades of armor or mechanized infantry could fight against comparable opposition for several days. To add realism, the Army placed specially trained cadre personnel at Fort Irwin. These soldiers were trained to simulate Warsaw Pact tactics and equipment. The exteriors of Army vehicles were altered to resemble Soviet tanks and equipment. MILES devices were placed on vehicles and personnel to add realism, with computers tracking the engagements and giving each commander an evaluation of his unit's strengths and

weaknesses.[65]

The Army also restructured its units in a program termed the Army of Excellence. Army doctrine was changing to envision a war with the Warsaw Pact as emphasizing rapid maneuver. The combat divisions, therefore, were to be organized for maximum flexibility in the fast-paced environment of a European war. The heavy divisions, which consisted of armor and mechanized infantry, were reorganized to provide better operational control. New emphasis was placed on the light infantry divisions to use the capabilities of dismounted infantry to its best advantage.[66]

One of the most important reforms came with the development of the so-called "AirLand battle." Faced with the massive Warsaw Pact formations combined with the demonstrated increase in lethality of weapons as demonstrated by the 1973 Arab-Israeli War, the Army sought a new method of fighting. In 1982, the Chief of Staff directed a reevaluation of Army doctrine, with the resulting implementation of the AirLand battle doctrine. This concept emphasized rapid maneuver and fluid battlefield. Instead of holding to fixed lines, commanders were to move to gain an advantage. Penetrations were to be met with counter-penetrations, with an effort to seek enemy weak points. Although it did not exclude the possibility of nuclear weapons, the new doctrine offered the possibility of fighting without weapons of mass destruction.[67]

The AirLand battle doctrine's development involved a number of Army installations. The inspiration and support for changing Army doctrine came from the Chief of Staff's office in the Pentagon; but responsibility for writing the doctrine went to TRADOC. TRADOC headquarters at Fort Monroe had primary responsibility for preparing the doctrine, with input from almost all of its subordinate schools. The Combined Arms Center at Fort Leavenworth and the Logistics Center at Fort Lee were especially important to the process. AirLand battle doctrine concepts were tested by soldiers from active units, especially in the training area at Fort Irwin and in the maneuver areas of Germany.

The new doctrine affected almost all aspects of Army operations, but some of the most tangible effects came with the force modernization discussed in the following section. To implement the AirLand battle doctrine, the Army required better and faster combat vehicles, communications equipment, aircraft, and most other equipment. Changes in doctrine and materiel acquisition were interconnected.

The renewed emphasis on a European environment also affected the type of divisions within the Army. In the jungles of Vietnam, light infantry units were most valued, although the Army did employ armor and mechanized infantry. In Europe, the situation called for greater mobility and firepower. This requirement led to greater emphasis on heavy divisions of armor or mechanized infantry. Even with their cumbersome logistical tail, these divisions were best suited to fighting Warsaw Pact formations in Europe or in other places where the terrain was relatively open. Nevertheless, the Army kept a number of so-called light divisions, consisting of nonmechanized infantry for use outside of Europe. The airborne (parachute) and airmobile (helicopter heavy) divisions were variations of the light division.

Army reforms of the late 1970s and 1980s were most evident in the themes of operational forces and Army schools, although they also affected the materiel development and logistics themes.

4.3.3 Force Modernization and Materiel Development

Force modernization constituted a vital part of the Army's post-Vietnam recovery and reform efforts. Following the neglect of materiel development during the Vietnam era, the Army embarked on an accelerated program of equipment modernization. As the focus of military planning turned once again to a war against the Warsaw Pact in Europe, equipment designed specifically for such a conflict received the highest priority. Soviet equipment modernization during and following the Vietnam era added a sense of urgency to the efforts. The Soviet Army now possessed weapons approximately equal to NATO counterparts in quality and combat effectiveness, especially for the tanks, armored personnel carriers, and helicopters.

Responsibility for force modernization was divided primarily between AMC and TRADOC. The TRADOC commander was responsible for stating the requirements for specific items of equipment, then for conducting operational tests during the development process, and finally for preparing the necessary doctrine and training for employing new items of equipment. The AMC commander was responsible for the design, development, production, and subsequent logistical support of new items of equipment.[68]

AMC experienced numerous reorganizations throughout these years. Of the changes within the structure of AMC's subordinate commands, three are particularly noteworthy. In 1976, AMC activated the Depot Systems Command to provide centralized control of the depots within AMC. In 1983, the Armament, Munitions, and Chemical Command (AMCCOM) was created through the merger of two separate commands, one of which performed research and development work, the other performed the materiel readiness functions. AMCCOM inherited a large network of arsenals and GOCO ammunition factories.[69] In 1985, the corporate laboratories, which previously reported directly to AMC headquarters, were organized into the Laboratory Command (LABCOM), with its headquarters at Harry Diamond Laboratories, Adelphi, Maryland.

The Army initiated studies during the Ford Administration that would begin the acquisition process for major new types of weapons and equipment. Defense spending, including research and development, rose slightly during the first two years of the Carter administration, and significantly during the last two years. Under the Reagan administration, the pace of modernization reached its peak as the Army fielded new equipment or weapons systems that affected virtually all aspects of its operations. By the close of the 1980s, the Army held almost a completely different generation of materiel including weapons, logistical equipment, and communications.

The most dramatic changes came with some of the major weapons systems. After much delay, the Army fielded a new tank that was far superior to any previous models. The infantry received a new vehicle that served as both a transportation method and a fighting platform. Artillery units received new multiple launch rocket systems (MLRS) and improved versions of conventional howitzers. New generations of antiaircraft missiles, antitank weapons, and helicopters all added to the Army's fighting capabilities. In the communications arena, the Army developed radios that could frustrate enemy jamming by rapidly changing frequencies. Less dramatic, but equally important, the Army produced new generations of ground vehicles that provided greater mobility and reliability than the World War II style vehicles. Even the venerable

quarter-ton utility truck (the jeep) and the .45-caliber pistol were replaced by new models.[70]

By the 1980s, the materiel acquisition had evolved into a complicated process, involving multiple agencies and contractors. The example of the M-1 (Abrams) main battle tank illustrates the difficulties and complexities of developing new weapons. As with other weapons systems, the M-1 tank involved multiple commands within AMC/DARCOM, the Armor School, and TRADOC. TRADOC, through the Armor School at Fort Knox, developed the basic requirements for a new tank, which AMC/DARCOM then developed. The Tank-Automotive Research and Development Command (headquartered at the Detroit Arsenal) had lead responsibility for the tank design, especially the hull and engine. The Electronics Research and Development Command (headquartered at Adelphi, Maryland, with laboratories at multiple locations) had responsibility for the electronic components. The Armament Research and Development Command (headquartered at Picatinny Arsenal) was responsible for the weapons systems. As the tank entered the production phase, the Army used the Lima Army Tank Plant, operated under a contract by Chrysler Corporation, to assemble the tanks.[71]

The M-1 tank demonstrated the complexities of force modernization. The entire process required the participation of numerous agencies within the Army and often approval of the Secretary of Defense. Typically, TRADOC developed the statement of requirements, AMC produced the equipment, and FORSCOM or overseas forces became the ultimate user. Design, testing, and production required extensive cooperation between the Army and the contractor, often with regard to the major components, as well as the end product.

With each new piece of equipment, the Army leadership was required to make difficult choices. To insist upon the most modern technology would increase the risks that new technology might produce unexpected problems. To wait until all the flaws were removed from a system before production would delay fielding and increase costs. Better technology resulted in higher costs and a more stringent cost/benefit analysis. Almost every piece of fighting equipment required some compromise between weight (usually for crew protection) and mobility. In all cases, it was essential to obtain favorable publicity and congressional approval.

The second half of the 1970s was marked by an increased emphasis on chemical warfare. Since the unexplained accident near Dugway Proving Ground in 1969, the Army had discontinued development of its retaliatory chemical capability and even limited its implementation of defensive measures. Intelligence reports of increased Soviet chemical warfare capabilities during the 1970s, however, convinced Army leadership that the United States would be at a serious disadvantage if the communists ever decided to use their chemical weapons. Consequently, the Chemical Corps was once again reconstituted as a separate branch, distinct from the Ordnance Corps, and its school was moved to Fort McClellan, Alabama.

The United States also conceived of a new method of producing nerve gas, called binary chemical weapons. The concept required that two nonlethal chemicals be placed in separate compartments of an artillery shell and not mix until after the shell was fired. Once fired, the spinning motion of the shell would mix the chemicals and create a lethal nerve gas. Binary weapons were not more lethal than earlier forms of nerve gas, but they were safer to handle and store. In 1980, Congress approved the funding for construction of a plant to produce binary weapons, located at Pine Bluff Arsenal. Pine Bluff initiated production of binary chemical

munitions, but opposition to them caused the Army to terminate the operation before full-scale production began.

Throughout the post-Vietnam era, the Army moved ahead with its force modernization program. By the mid-1980s, it had replaced most of its Vietnam or earlier generations of equipment. The result was a force far more capable of deterring or defeating Warsaw Pact advances in Europe without resorting to massive nuclear warfare. Important themes of this period are basic research and materiel development.

4.3.4 Communications and Information Management

At the close of the Vietnam conflict, the Army still relied on 1950s-vintage radios and communications equipment, even while the civilian world was rapidly advancing communications and adapting to modern computers. During the post-Vietnam years, modernization of the communications functions proceeded in two areas: changing the emphasis on the full range of information management functions and upgrading equipment.

In 1984, the Army recognized the changing nature of communications and electronics functions by redesignating the Army Communications Command to the Army Information Systems Command. The change recognized the fact that modern computers multiplied the amount of information available to commanders and managers, with a corresponding requirement to provide some form of standardization and management. The changes in information technology had affected both the Army on the battlefield and the routine management functions of a peacetime Army. Consequently, the Information Systems Command assumed responsibility for computer development, visual information, and records management.[72]

At the same time, the Army developed and distributed a wide range of new communications equipment, especially for tactical communications. Typically, the electronics laboratories at Fort Monmouth performed much of the basic research, while the communication-electronics RDE Center, also at Fort Monmouth, managed the actual design and transformed the technology into a useful system. The Electronics Proving Ground at Fort Huachuca tested the new designs. The Army replaced the older radios with a new version that could hop across the full spectrum of frequencies to prevent enemy jamming or detection. The old switchboards and clumsy tactical antennae gave way to new types of equipment that required less space while providing the user with more reliable communications, thus emphasizing both the communications and materiel development themes.[73]

4.3.5 Strategic Defense Initiative

On March 23, 1983, President Ronald Reagan announced his intention to develop a radically different approach to strategic policy, replacing the tradition of mutual assured destruction (MAD) with one of security from a ballistic missile attack. He argued that new technology might enable the United States to deflect Soviet missiles early in their flight. "Would it not be better to save lives than to avenge them? ... But what if free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack; that we could intercept and destroy strategic ballistic missiles before they reach our own soil and that of our allies?" The President announced that he was directing a program to conduct advanced research in ballistic missile defense. The program would later be designated SDI, more popularly known as "star wars."[74]

Ballistic missile defense had languished since the demise of the Safeguard program in 1976. Its critics argued that such systems only accelerated the arms race because they merely encouraged the other side to develop more offensive weapons and that they could never be completely effective. It was better, the critics asserted, to rely on the established system of mutual deterrence. Proponents contended that the program would make strategic nuclear warfare obsolete by destroying all missiles early in their trajectory. Less strident proponents admitted that the initiative would form an imperfect shield, but it would protect enough missile silos to assure a stable deterrent. Others held that SDI would make a useful bargaining chip for future negotiations with the Soviet Union.[75]

The SDI research promoted new technologies that were substantially different from preceding ballistic missile defense efforts. Previous ABM systems were designed to send another ballistic missile upon an intercepting trajectory and to detonate a nuclear warhead when the two missiles reached a close proximity. The SDI proponents envisioned an advanced, space-based defense network that used x-ray lasers or similar advanced science. Indeed, the concept seemed so far removed from contemporary technology that the term "star wars" filled the popular imagination.

Throughout the remainder of the Cold War, SDI remained a research and development effort. It did not become an operational system or even reach advanced development stages. The 1972 ABM treaty between the United States and the Soviet Union limited the fielding of operational systems, but not research and development. Therefore, the United States remained in compliance with the treaty, although the Soviets strenuously objected to the proposed system. The effect of SDI on the Soviets was one of the most controversial aspects of the program. Its proponents have asserted that SDI accelerated the decline of the Soviet Union by causing the country to accelerate unproductive spending programs in an effort to keep pace with the United States. Its critics have argued that SDI heightened Soviet suspicions of the United States and may have prolonged the Cold War.[76]

As a research effort, responsibility and funding for SDI was widely distributed. The Air Force, Army, and Navy all participated in the SDI development. With its traditional involvement in space-related efforts, the Air Force was the largest recipient of SDI funding. The Army, however, capitalized on its history of ballistic missile defense to play a critical role in the program. The Navy's interest in satellites and military communications also justified a role for that service.

Even the Department of Energy employed its laboratories and research capabilities to perform some of the basic research.[77]

To coordinate its SDI efforts, the Army activated the Army Strategic Defense Command (ASDC). In 1985 the ASDC had facilities at Huntsville, Alabama and the Kwajalein Atoll. The Kwajalein Atoll played a critical role in SDI research. Its location in the central Pacific complemented Air Force and Navy installations along the California coast because missiles fired from locations in California could be tracked by Kwajalein's sophisticated electronic equipment as they reached the central Pacific. Kwajalein became a vital part of the interservice research efforts in missile defense.[78]

4.3.6 Other Army Initiatives and Operations

Although most of the Army's energy during the post-Vietnam years was devoted to Europe and NATO, its worldwide commitments remained intact. Although its presence in Korea was reduced to one division, and a supporting structure, the presence signified the American commitment to Korea and its protection from communist expansion.

At the beginning of the post-Vietnam era, the United States had a minimal presence in the Persian Gulf and Southwest Asia. A 1977 study, however, recommended establishing a Rapid Deployment Joint Task Force (RDJTF) to move U.S. forces quickly to areas outside of Europe and Korea. Events in 1979 and 1980 added to the urgency of that requirement. First, a revolution in Iran deposed the monarchy and installed an Islamic state hostile to the United States. It allowed Iranian radicals to seize the United States embassy and hold its diplomats hostage. While the United States was still embroiled in the hostage crisis, the Soviet Union invaded Afghanistan and placed its own government in power. The new Soviet move appeared a substantial threat to the oil-producing regions in the Persian Gulf.

In response, President Carter announced that the United States was committed to preventing further Soviet advances within the Persian Gulf region. He accelerated planning for the RDJTF, with the specific mission of protecting U.S. interests in Southwest Asia. Initially, the task force was merely a headquarters, with no units permanently assigned, although the services designated those units that would compose the task force in the event of an emergency. For example, the Army's XVIII Airborne Corps was the most important Army element of the task force. Through the early 1980s, planning for deployment to the Middle East improved as all the services added to their logistical capabilities to include more transport ships, pre-positioned stocks, and negotiated basing rights. In 1981, the United States held its first BRIGHT STAR exercise in which American forces practiced deploying to Egypt and maneuvering in the desert. Elements from the 101st Division represented the Army. Even though the Soviet threat to the Persian Gulf never materialized, the planning enabled the United States to move its forces into that region in response to Iraq's invasion of Kuwait in 1990, shortly after the close of the period covered by this study.

In 1983, RDJTF was deactivated, to be replaced by the United States Central Command (CENTCOM). Although CENTCOM was composed of the same people as the RDJTF, its elevation to a joint command emphasized the increased importance given to this part of the world. CENTCOM, based at McDill Air Force Base, Florida, was a planning headquarters without

fighting forces assigned until an event arose. The Army designated the Third Army headquarters as the planning headquarters for the Army component of CENTOM. In this capacity, the Third Army was also known as (ARCENT). Although the initial justification for the creation of CENTOM was the possibility of further Soviet gains in the Middle East, the command became the joint headquarters for U.S. forces in operations DESERT SHIELD/DESERT STORM.

In 1983, a leftist government seized control of the Caribbean island nation of Grenada. In response, President Reagan sent the U.S. military, with the ground forces consisting of both Marines and soldiers from the 82nd Airborne Division, plus Rangers, and a special organization known as Delta Force. The United States achieved a quick victory largely because the opposing forces consisted of the small Grenada self defense forces and some Cuban volunteers. Given the tremendous disparity between the forces, the operation ought to have been relatively easy. Nevertheless, difficulties in interservice planning, including poorly designated responsibilities and general lack of coordination made the operation unnecessarily complicated. Problems revealed during the Grenada invasion spurred passage of the Goldwater-Nichols Act of 1986, which was designed to improve interservice operations.[79]

4.3.7 End of the Cold War

Ever since the closing months of World War II, confrontations with communist nations, especially the Soviet Union, dominated United States foreign and military policy. With varying degrees of intensity, the two nations contested the future of Europe and competed for influence in developing nations. American military personnel fought two land wars in Asia arising from a fear of communist growth.

During the second half of the 1980s, however, the Cold War era terminated with a swiftness that surprised most observers. The ending seemed almost anticlimactic considering the levels of mutual suspicion that had existed for more than 40 years. It is also interesting that Ronald Reagan, one of the most vocal advocates of Cold War politics led the reconciliation with the Soviet Union.

In retrospect, the rise of Mikhail Gorbachev as leader of the Soviet Union in March 1985 marked the beginning of the end for the Cold War. Gorbachev wished to reverse the economic inferiority of the Soviet Union, especially in comparison to the western nations. To do so, he instituted a program of *perestroika*, or a restructuring of the Soviet economy closer to a capitalist model. To assist his drive toward economic reform, he began a policy of what was termed *glasnost* or opening public issues to debate and criticism. Believing that the military was consuming an excessive portion of economic resources, Gorbachev began reducing both the nuclear stockpile and conventional military forces. Some reductions were made through negotiations with the United States for mutual cutbacks, while other economic measures were made unilaterally. He also removed the Soviet Union from its futile guerilla war in Afghanistan.

Once the process of reform had begun, Gorbachev discovered that it could not easily be reversed. In the fall of 1989, the Soviet Union announced its intent to allow the eastern European block nations to determine their own future, and the citizens responded by removing their communist governments. The Soviets even dropped their instinctive opposition to German unification.

On 10 November 1989, one of the most notorious symbols of the Cold War, the Berlin Wall, came down. With Soviet acquiescence, the citizens of Berlin removed the wall and the city was reunited. The destruction of the wall marked a symbolic end to the Cold War.

During the ensuing years, the Soviet Union dissolved into a confederation of independent states, the largest being Russia. While most of the former Warsaw Pact nations have experimented with capitalist economies, other nations, notably China, Cuba, and Vietnam, have continued to adhere to a communist ideology. Even the collapse of the Soviet block has not resulted in a stable world, as U.S. military forces have engaged in conflicts in the Persian Gulf, Somalia, and the Balkans. Nevertheless, the threat of a massive Warsaw Pact military is no longer a serious consideration for of the United States.

4.4 IN RETROSPECT

The time between the end of World War II and the collapse of the Berlin Wall marked some of the most challenging and complicated years of the Army's history. Faced with the unprecedented task of containing communist expansion while minimizing the risk of actual conflict, the Army performed a vital service to the noncommunist world. The Army served as a ground component of the conventional force capability that complemented the strategic nuclear weapons.

The Army's contribution to NATO was critical to the western Cold War strategy. Especially after the flexible response policy was implemented, conventional forces afforded the NATO alliance with a third alternative between capitulation to minor aggression and total nuclear war. For almost a generation, American troops provided the military capability to make this alternative feasible. The potential use of tactical nuclear weapons complicated this strategy, but fortunately the alliance never faced actual combat with the Warsaw Pact. The Army achieved its mission through deterrence.

On the Pacific rim, the Army also played a critical role in promoting U.S. policy in conjunction with the other services. In Korea, the bitter conflict enabled the South Korean Government to thrive free from communist domination. The U.S. military's continuing presence in Korea has preserved stability for the South Koreans. In Vietnam, the failure of the U.S. Government to recognize the genuine nationalist appeal of the communists ultimately led to defeat in one of the principal episodes in the Army's Cold War history.

Army air defense of the continental United States marked another significant contribution to the Cold War history. Beginning in the 1950s, Army antiaircraft and antiballistic missiles provided the major air defense component of the United States' overall nuclear strategy. Later, the Army adjusted to its limited efforts to ballistic missile defense and, ultimately, to participation in SDI.

Although much smaller in scale than other military operations, the Army's role in the Caribbean basin was also a part of Cold War history. In conjunction with the Navy and Marine Corps, Army units prevented leftist governments from gaining control over the Dominican Republic and Grenada.

To support these operations, the Army's logistical system changed and modernized. At the beginning of the Cold War era, the technical services operated in their long-standing independence, each maintaining its own logistical system. In 1962, as part of Robert McNamara's reorganizations of the Pentagon, the technical services were abolished and replaced by the AMC as the major logistical organization. Through all the reorganizations, the Army's materiel development process kept pace with the ever-increasing complexity of modern weapons and military technology.

Throughout its Cold War history, the Army adapted to its changing circumstances with increasing sophistication. Faced with the Eisenhower administration's emphasis on massive nuclear retaliation in the New Look, senior Army leaders articulated a requirement for adequate conventional forces while simultaneously defining a role for the Army in the air defense of the United States. Army leaders encouraged adoption of the flexible response within NATO and helped to shape the forces that could provide a credible conventional deterrent to the Soviet Union. After the devastating experience in Vietnam, the Army recovered, even with the change to an all volunteer force. It then embarked on an unprecedented program of materiel modernization and adopted a doctrine of rapid maneuver to employ its new equipment.

Ultimately, the success of the U.S. Army and the other noncommunist military forces can be judged by the fact that the free world prevailed in the Cold War without any overt hostilities with the Soviet forces.

5.0 THEMES

From 1947 to 1989, the primary mission of the Army was to deter or defeat communist growth in conjunction with other services and allied nations, without using strategic nuclear warfare, preferably without using nuclear weapons. A secondary mission was to support the defense of the United States through antiaircraft missiles and antiballistic missiles systems. The ten themes discussed within this section contributed in some way to the accomplishment of these two missions. The successes and failures discussed in Chapter 4 resulted from the Army organization that incorporated the functions shown in these themes.

To be successful, any army must integrate a variety of functions, ranging from supplying the forces with modern equipment and training the soldiers to supporting communications or intelligence. These functions are reflected in the themes discussed within this section. The themes also generally reflect the Army's organization at the close of the Cold War era. For example, the first three themes (Basic Scientific Research, Materiel Development, and Wholesale Logistical Operations), are related to the Army Materiel Command.

This chapter can be used independently from chapter 4.0, the Historical Narrative, to explain where a particular property type fits into the general Cold War historic context. Themes are provided to more clearly understand the role a particular property might have played during this period.

The first themes of Basic Scientific Research, Materiel Development, and Wholesale Logistics are all related to obtaining sufficient quantities of technologically superior equipment. The theme relating to air defense, ballistic missile defense, and Army missiles reflects the Army's responsibilities for the defense of the continental United States and its use of missiles on the battlefield. The themes relating to communications, intelligence, and computers show the interconnections of these topics, and how they assisted the Army during the Cold War. The theme of the Army school system explains how soldiers were trained to perform complicated tasks under battlefield conditions. The theme of operational forces reflects the requirements of the Army to produce forces that could be deployed into a theater of operations. Finally, the Miscellaneous Themes section illustrates topics of interest for cultural resources management that do not fit into other categories.

To accomplish the purposes described in these themes the Army acquired real property, whether buildings, structures, or open spaces. These properties constitute the physical legacy of the Army during the Cold War. Some properties were unique or extremely unusual; others were common. Some properties were inherited from World War II and adapted for the Cold War; others were constructed during the Cold War. All the properties and the associated themes worked to help the Army function within the context of the Cold War.

5.1 BASIC SCIENTIFIC RESEARCH (LABORATORIES)

Throughout the Cold War era, the Army continually sought to use scientific knowledge to place the most technologically advanced equipment and weapons into the hands of its soldiers. The efforts at materiel development are discussed in sections 4.1.8, 4.2.11, and 4.3.4. These efforts required scientific research to expand the knowledge of military technology, and then required a materiel development process to transform this technology into actual weapons or equipment.

Although the military had participated in scientific research throughout its history, the demands of the Cold War resulted in an intensified search for technological solutions to military problems. The Army's basic scientific research program increased accordingly. The process resulted in an expanded laboratory system.

Until the Army reorganization of 1962 (see section 4.2.11), each of the technical services managed its own research program. The Ordnance Department and the Signal Corps operated the largest programs. Ordnance laboratories performed important research regarding ballistics, armor protection, and electronic ordnance components, among other subjects. The Ballistics Research Laboratory, part of the Ordnance laboratories, introduced the ENIAC, a forerunner of modern computers. The Signal Corps efforts contributed to the development of solid state electronics and space exploration. The other technical services also maintained research programs related to their areas of expertise, such as the Quartermaster laboratories at Natick, Massachusetts.

With the 1962 reorganization of the technical services into the new AMC, the distinction between basic research and materiel development emerged. In theory, basic research applied to militarily useful technologies that might have multiple applications, whereas materiel development was intended to transform technology into specific weapons or equipment. Materiel development research was assigned to the AMC commodity commands. Eight laboratories reported directly to AMC Headquarters: Ballistics Research Laboratory, Human Engineering Laboratory, Coating and Chemical Laboratory, all located at Aberdeen Proving Ground; the Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire; the Army Materials Research Agency, Watertown, Massachusetts; Natick Laboratories, Natick Massachusetts; Harry Diamond Laboratories, Adelphi, Maryland; and the Polar Research and Development Center, Fort Belvoir, Virginia. With the many reorganizations of AMC, names and designations of basic research laboratories have changed. The Natick Laboratories were redesignated a research and development center, while the Cold Regions Laboratory was transferred to the U.S. Army Corps of Engineers. Other laboratories were closed and new ones opened. As of 1988, as the system reached its maturity and as the Cold War came to an end, seven laboratories remained:

1. The Atmospheric Sciences Laboratory, White Sands, New Mexico, conducts basic research in meteorology, including atmospheric sensing technology.

2. The Ballistics Research Laboratory, Aberdeen Proving Ground, Maryland, conducts research on weapons systems of all types, including methods to improve lethality and to enhance protection against enemy weapons. During World War II and the early years of the Cold War, the Ballistic Research Laboratory pioneered the use of computers to compute ballistic trajectories.

3. The Electronics Technology and Devices Laboratory, Fort Monmouth New Jersey, evolved from the former Signal Corps laboratories at Fort Monmouth and is responsible for basic research into advanced electronics, including microwave electronics.

4. Harry Diamond Laboratories, Adelphi, Maryland, conducts research in a variety of advanced technologies, including fuzing, target detection, ordnance electronics, electromagnetic effects, and nuclear weapons effects. The installation was formerly the LABCOM headquarters at the close of the Cold War.

5. The Human Engineering Laboratory, Aberdeen Proving Ground, Maryland, is responsible for research to make weapons and equipment fit the soldier, rather than making the soldier fit the equipment.

6. The Materials Technology Laboratory, Watertown, Massachusetts, conducted research into advanced metals, mechanics, and composite materials until it closed in 1995.

7. The Vulnerability Assessment Laboratory, White Sands, New Mexico, conducts research into Army vulnerability to radio jamming and electronic warfare.[80]

In addition to the seven laboratories, the Army operated the Army Research Office at Research Triangle Park, North Carolina. Still active today, its purpose is to coordinate contracted research with universities and private industry.[81]

Within the Army, the term "laboratory" designates an organization or activity whose primary mission is to conduct basic scientific research. The physical attributes of the laboratories include the facilities and equipment that may resemble a traditional concept of an enclosed work area equipped for experimentation, as well as outdoor research facilities. Each laboratory contains office space for administration and support functions, as well as the actual laboratories. The physical description of the laboratories varies depending on their specific mission. Often, the equipment found in these laboratories was unique and impressive. For instance, until 1996, the Harry Diamond Laboratory contained a large device known as the Aurora, which could produce an intense amount of gamma radiation for a short time, to simulate the effects of an atomic burst and to measure the effectiveness of defensive shields. Although some laboratories (Harry Diamond and Materials Technology) encompass entire installations, others are tenant activities at larger installations. That is, the laboratories physically occupy a small portion of a larger Army post, even though they do not report to them for operational purposes.

Whether operating under the technical services or under AMC the Army laboratory system influenced the technological history of the Cold War by bringing modern weapons into the Army's arsenal.

5.2 MATERIEL DEVELOPMENT (RESEARCH, DEVELOPMENT, AND ENGINEERING CENTERS AND PROVING GROUNDS)

Materiel development is the process of transforming a concept into an actual weapon or piece of equipment. It requires the application of technology in the design and engineering of equipment, followed by testing and evaluation through the development cycle. The materiel development constituted a part of the Army's efforts to use superior technology to gain an advantage over the Warsaw Pact forces. During the Cold War years, the Army intensified its efforts toward improved technology by expanding on the existing base of research and development activities. Materiel development was assigned to RDE Centers, which were responsible for developing the items, and proving grounds, which tested new items.

Like the basic research programs, the materiel development programs originated with the technical services and were reassigned in 1962 to the subordinate commands within AMC. The transition from the technical services to AMC and the concurrent efforts at materiel development are discussed in sections 4.1.8, 4.2.8, and 4.3.3.

5.2.1 Research, Develpment, and Engineering Centers

The purpose of an RDE center is to produce specific weapons or items of equipment using the best available technology. An RDE center may conduct its own in-house research or it may contract assignments to private industry. For this reason, each center consists of a combination of office space and research equipment. The particular mix depends on the nature of each center; some are primarily centers for contracting research, while others conduct the a large portion of their own research.

The location of RDE centers shifted throughout the history of the Cold War. Installations that do not have RDE centers today may still have resources associated with earlier materiel development if they once had RDE centers. For example, at the opening of the Cold War, Fort Detrick, Maryland, was a center for research into retaliatory and defensive biological warfare. With President Nixon's decision to terminate research into biological warfare in 1969, the post lost this mission and was transferred to the Office of the Surgeon General in 1972. Today it is a center for medical research. Nonetheless, it may contain resources associated with its earlier mission. As of 1988, AMC operated eight RDE centers:

1. The Armament RDE Center, Picatinny Arsenal, New Jersey, serves as the Armaments, Munitions, and Chemical Command center for developing weapons and ammunition. Prior to its transformation into an RDE center, Picatinny Arsenal was recognized for its expertise in artillery ammunition and explosives. Before World War II, it was the Army's center of expertise for the production of ammunition, which later translated into expertise in weapons development. Some of its achievements during the Cold War era

included producing new antitank weapons, warheads for Army missiles, composite plastic materials, and smart munitions, and assisting the AEC in developing nuclear munitions. Since 1975, the Armament RDE Center has controlled Stephen Vincent Benet Laboratories, which are physically located at Watervliet Arsenal, New York. This facility has specialized in the technology related to artillery and rockets. Army personnel there developed a method of improving the strength of a barrel by cold compression, known as autofrettage.[82]

2. The Chemical RDE Center, Aberdeen Proving Ground (Edgewood), Maryland, has historically been the home of the Chemical Warfare Service, with laboratories on the installation since World War I. During the immediate post World War II years, these facilities were used for process engineering, that is creating pilot production facilities for chemical munitions before the Pine Bluff or Rocky Mountain Arsenals began actual production. Today, the facility is a part of the U.S. Army Chemical and Biological Defense Command, which is a subordinate command of AMC, and is responsible for developing protective clothing and equipment.

3. The Aviation RDE Center, St. Louis, Missouri, coordinates research efforts regarding airframes, propulsion systems, and avionics (electronic components). The Aviation Research and Technology Activity, a subordinate organization, is physically located next to a NASA research center in California. The Avionics Research and Development Activity, another subordinate activity, is located at Fort Monmouth, adjacent to the Communications-Electronics Command RDE Center.

4. The Communications-Electronic Command RDE Center, Fort Monmouth, New Jersey, is the Communications-Electronics Command's research facility for materiel development in all aspects of communications and electronics, including the electronic components of major weapons systems. In addition to the buildings at Fort Monmouth, this RDE center controls several subordinate activities. One is the Electro-Optical Laboratory at Fort Belvoir, which manages research in night vision devices for all four services. The Signals Warfare Laboratory at Vint Hill Farms Station, Virginia, conducts research related to electronic warfare and electronic surveillance.

5. The Missile Command RDE Center, Redstone Arsenal, Alabama, is the Army's lead organization for all aspects of missile development, including guidance systems. The center contains a combination of office space and research facilities. Some of the in-house testing equipment includes static test platforms and laboratory facilities.

6. The Tank Automotive Command RDE Center, Warren, Michigan, manages Army materiel development for vehicles, including tanks and other combat vehicles, usually working in close cooperation with the automotive

industry. Located adjacent to the Detroit Arsenal, it contains an engine test facility. Today, most research and development work relating to military vehicles, including combat vehicles, is contracted to private industry, with the Center managing and coordinating the development work.

7. The Belvoir RDE Center, Fort Belvoir, Virginia, is one of two centers belonging to the Troop Support Command. It coordinates research regarding combat engineering, logistics support materials, and petroleum.

8. The Natick RDE Center, Natick, Massachusetts, is the second of the two Troop Support Command RDE Centers. It is responsible for the acquisition of all material support to the individual soldier, ranging from clothing to food. Originally opened in 1954 as a research facility for the Office of the Quartermaster General, it contains office space, small laboratories, and a climatic test chamber for evaluating the effects of personal equipment in extreme temperatures. It also has a rain tower often used to test tents and canvas.[83]

5.2.2 Proving Grounds

Proving grounds are another important category of property associated with materiel development. Their purpose is to test prototypes and new equipment to determine if they meet the contract specifications and the needs of the Army. Proving grounds also test prior to purchases of existing models and items to ensure that they meet Army specifications. Today's proving grounds are characterized by extensive range areas or open ground, combined with sophisticated equipment for monitoring the progress of each test.

Until 1962, proving grounds were the responsibility of the technical services, especially the Ordnance Department. With the activation of AMC, proving grounds and related activities were transferred to TECOM, which became the single agency responsible for testing all equipment accepted into the Army. When TECOM inherited the testing and evaluation mission from the technical services, it also gained control of 43 separate testing agencies or activities. Some activities had as few as 15 assigned individuals. Under TECOM, these activities were consolidated, and smaller activities were eliminated. As of 1985, the command controlled nine major test activities:[84]

1. Aberdeen Proving Ground, Maryland, is headquarters for TECOM and the home of the U.S. Army Aberdeen Test Center, a subordinate activity of TECOM that performs the actual testing. Testing at Aberdeen began during World War I, with an emphasis upon proof firing of artillery. That role has expanded to include all types of weapons, components, automotive equipment fire control systems, and personal equipment.

2. Jefferson Proving Ground, Indiana, conducted production testing of ammunition and its components. It is being closed under the Base Realignment and Closure program.

3. Dugway Proving Ground, Utah, is the proving ground for chemical munitions. Its facilities include laboratories and grids for testing chemicals outdoors.

4. Yuma Proving Ground, Arizona, has ranges and instrumentation facilities that are used to test long-range artillery, aircraft weapons, and airdrop equipment. Its desert environment allows testing of miscellaneous types of equipment under desert conditions.

5. White Sands Missile Range, New Mexico, was the site of the first atomic test shortly after its opening in 1945. This site is recognized by listing in the National Register of Historic Places. During the Cold War, the missile range served as a vital missile testing facility for the Army, other services, and NASA.

   Presently, the facility contains some of the most modern and costly instrumentation equipment available. Much of the monitoring equipment is vehicle mounted. White Sands also has three subinstallations at Green River, Utah; Mountain Home, Idaho; and Gallup, New Mexico. These subinstallations were constructed during the 1960s to send missiles toward the impact area at White Sands and consist primarily of launch stands.[85]

6. The Cold Regions Test Center, Fort Greeley, Alaska, is used to test weapons and equipment under extremely cold conditions.

7. The Electronic Proving Ground, Fort Huachuca, Arizona, was established at the historic cavalry post in 1954. The Electronic Proving Ground tests electronic communications, intelligence, and related equipment. The site was selected by the Signal Corps because of its isolated location, which allowed experimentation without the interference of commercial broadcasting. This proving ground specializes in both communications technology and electronic warfare. One of its facilities includes an Electromagnetic Environmental Test Facility at nearby Tuscon, where a contractor conducted experiments in electronic warfare. At Fort Huachuca, an anechoic chamber allows for testing of electronic emissions by Army equipment and assessment of vulnerability to hostile electronic measures. Another Cold War facility at the Electronic Proving Ground is the Measurement Laboratory, which was constructed underground to protect personnel from microwave radiation and to leave the surface free from obstructions.[86]

8. Aviation Development Test Activity, Fort Rucker, Alabama, tests both fixed-wing aircraft and helicopters, including engines, airframes, and ground support systems.

9. Tropic Test Center, Fort Clayton, Republic of Panama, tests weapons and equipment under tropical conditions.

The Aberdeen, Jefferson, Dugway, White Sands, and Yuma Proving Grounds are TECOM-owned installations. The other activities are tenant activities on larger installations.

Although the above list includes all proving grounds in operation during 1985 near the end of the Cold War, it does not include former proving grounds that closed prior to that date, especially those operated by the technical services. Therefore, it is possible that resources associated with Cold War proving grounds may be found at other locations. (Appendix E provides a list of installations and their missions at different points during the Cold War.) For example, the U.S. Army Corps of Engineers operated a proving ground in Fairfax County, Virginia, a few miles from the main post at Fort Belvoir. That land is still part of Fort Belvoir. The Office of the Quartermaster General operated a General Equipment Testing Activity at Fort Lee, Virginia, whose distinctive features included lead-lined buildings for testing resistance to radioactivity.[87]

The relationship between proving grounds and RDE centers is complementary and mutually supportive. For example, in cooperation with private industry, the Communications-Electronics RDE Center performs the basic research and testing necessary to produce the prototype models of a piece of communications equipment. Then TECOM will assume responsibility for independent and unbiased testing to certify that the equipment meets the Army's needs. The electronic proving grounds have lead responsibility for testing the electronic capabilities, but other proving grounds will be used to determine if the equipment can withstand desert, arctic, or tropic conditions.

Although AMC activities are the primary focus of materiel development, other installations also are important to the process. TRADOC (previously Continental Army Command) is responsible for defining requirements and works closely with AMC to develop new items of equipment. Such activities, however, are less likely to have distinct property types, as they require office buildings rather than specialized testing or research facilities to conduct their mission.

5.3 WHOLESALE LOGISTICAL OPERATIONS

After materiel development, equipment must be placed into the hands of the operational forces. Materiel must be produced, stored, repaired, and managed to maintain combat readiness while avoiding excess costs. The peculiar nature of the Cold War added another dimension to the logistical effort. To preserve a credible deterrent, the Army required forces capable of entering combat on short notice. AMC and its predecessor organizations played an important role in the history of the Cold War by contributing to the materiel readiness of the Army.

For the purposes of this study, wholesale logistics includes: (1) inventory management of stock supplies owned by the Army, (2) production of selected types of ammunition and ordnance (using arsenals and ammunition plants), and (3) storage and maintenance of Army-owned supplies and equipment (using depots). The inventory management function typically is performed in office buildings, at centers known as National Inventory Control Points. The production and storage/maintenance functions require specialized buildings that fall within the scope of this study.

Until 1962, wholesale logistical support was also a function of the technical services, which operated their own network of depots and selected production facilities. After 1962, AMC assumed responsibility for these installations. Two types of facilities associated with Wholesale Logistical Operations are discussed below.

5.3.1 Production Facilities

Although the military relies primarily upon private industry to meet its materiel requirements, the Army also maintains a production capability for a few items. This capability, which can be traced to the Army's pre-World War II network of arsenals, continued to support the Army during the Cold War.

Ammunition plants evolved from World War II construction efforts. Following World War I, commercial ammunition factories closed, and the property was converted to other uses. By the beginning of the U.S. mobilization for World War II, only Picatinny Arsenal could operate production lines for ammunition, and these were pilot lines that were not designed for large-scale production. Lacking a production base for ammunition as the war approached, the War Department built a network of ammunition factories, and then employed private industry to manage and operate them. These became known as GOCO facilities. Following the war, the Army closed many of the plants, while leaving most of the remainder in an inactive, stand-by status. During the Korean War, a large portion of these inactive plants were reopened to meet the needs of that conflict.

5.3.1.1 Ammunition Plants

Following the Korean War, the history of each plant has varied considerably. Some, such as the Lone Star Army Ammunition Plant, Texas, have remained active, with frequent renovations and improvements. Others such as Ravenna Army Ammunition Plant, Ohio, returned to an inactive status, with only a partial reopening during the Vietnam conflict. The extent of new construction also varied. For example, 52% of Lone Star Army Ammunition Plant's buildings

date from World War II, whereas 92% of Ravenna Army Ammunition Plant's buildings date from World War II. The number of new buildings, however, is only a partial indicator of the extent of modernization. At Sunflower Army Ammunition Plant, Kansas, most of the buildings date from World War II, but the production lines were significantly altered to accommodate changes in technology during the Cold War era.

The Mississippi Army Ammunition Plant, constructed between 1978 and 1984, is the only completely new GOCO ammunition plant constructed during the Cold War. Built for the manufacture of an improved 155mm artillery projectile, the plant is now inactive.

In 1977, as the Army assumed responsibility for the production of conventional ammunition for all services, it also acquired Navy production facilities, including what are now the McAlester Army Ammunition Plant, Oklahoma, and the Hawthorne Army Ammunition Plant, Nevada. As of 1984, the Army owned 27 ammunition plants.[88]

5.3.1.2 Arsenals

In contrast to its policy of producing conventional ammunition in GOCO's, the War Department relied on its own arsenals to produce toxic chemicals during World War II. Three new arsenals became the Chemical Warfare Service's principal large-scale production facilities: Huntsville Arsenal, Alabama; Pine Bluff Arsenal, Arkansas; and Rocky Mountain Arsenal, Colorado. The Army produced all types of chemical ammunition in these facilities, including toxic gases, flame weapons, smoke, pyrotechnics, and riot control agents (tear gas). Following the World War II, Huntsville merged with the adjacent Redstone Arsenal to become a critical installation for rocket and missile development.

Rocky Mountain and Pine Bluff Arsenals continued to produce various forms of chemical weapons intermittently throughout the Cold War period. From 1961 to 1968 the Army also produced the nerve agent VX at the Newport Army Ammunition Plant. Rocky Mountain Arsenal became an important center for the production of nerve agents through the 1960s. It also became a serious environmental and public relations problem after the Army attempted to dispose of toxic agents in a specially constructed tunnel. Today, the land is being transformed into a wildlife refuge, as the cleanup progresses.

Pine Bluff Arsenal continued to produce most forms of chemical munitions, including pyrotechnics. For the most part, the installation consisted of World War II era buildings with concrete floors and asbestos tile walls. Buildings designed specifically to produce toxic chemicals contained extensive piping systems with tanks for improving the process. Pine Bluff also contained a facility to produce biological agents until President Nixon ordered the destruction of all biological warfare capabilities in 1969. Subsequently, the buildings associated with biological warfare were transferred to the Department of Health, Education, and Welfare (now Health and Human Services).[89] Specific information on Army developments related to chemical warfare are discussed in sections 4.1.9 and 4.2.9.

Since the 1880s, Watervliet Arsenal in upstate New York has served as the Army's center for producting modern artillery, especially gun tubes, and it continues that role today. The work of producing a tube that can repeatedly withstand the tremendous pressure of firing artillery shells

is so specialized that Watervliet has developed the sophisticated machinery for this purpose. During the Cold War, the arsenal expanded its capabilities for metal work related to rockets and missiles. Examples of specialized machinery include the autofrettage device, for strengthening a gun barrel by intense compression, and the hydro-spin machine, which can shape a rocket body through a spinning process. Starting in 1978, Watervliet underwent extensive modernization of its buildings and facilities. Many old buildings were demolished and new production buildings were constructed.[90]

Other pre-World War II Ordnance Department arsenals gradually reduced their production capabilities as they evolved into research and development centers. Watertown Arsenal, Massachusetts, manufactured artillery until production functions were closed abruptly and the facility transformed into the Materials Technology Laboratory in 1962. Picatinny Arsenal gradually changed its workload away from production until it became exclusively an RDE center. Rock Island Arsenal, Illinois, developed and manufactured small quantities of rocket launchers, artillery components, and tank guns. It contained a rebuild facility for tanks until 1972. After the Vietnam conflict, however, Rock Island's production capabilities shifted to specialized small-order contracts that required highly skilled workers. Rock Island can still produce special orders. Two former arsenals also served as centers of technical expertise until their closure and sale. Springfield Armory specialized in small arms until 1968. Frankford Arsenal specialized in optical and fire control instruments until 1977.

The Detroit Arsenal, located in Warren, Michigan, with its subinstallation in Lima, Ohio, continued its World War II role as a manufacturing facility for tanks, even after the RDE center was also placed at the arsenal. The original factory was built as the United States mobilized for World War II, using a design by the noted industrial architect Albert Kahn. Between World War II and the Korean conflict, the tank factory built experimental models and performed rebuild work on existing tanks. With the outbreak of hostilities in Korea, the Detroit Arsenal once again became a production plant for new tanks. It continued to produce at a greatly reduced scale through the 1950s. In 1960, the Army began to produce the M60 tank at the Detroit Arsenal and continued to produce that model through the early 1980s, although it was produced largely for export to allied nations during the 1980s.[91]

From World War II to the Korean Conflict, the Lima Army Tank Plant had prepared tanks for shipment overseas and performed minor modifications in the process. After the end of fighting in Korea, the plant remained inactive until 1976. At that time, the Army decided to use Lima to produce its new M-1 tanks as a GOCO facility operated first by Chrysler Corporation then by General Dynamics. Renovation of the production lines began in 1976, with the production of tanks beginning in 1979.[92]

5.3.1.3 Other Facilities

Other production facilities existed for special purposes. The Tarheel Army Missile Plant began as a World War II GOCO facility for the Army Air Force and was transferred to the General Services Administration following the war. In 1952, Western Electric began producing guidance systems for the Nike Ajax system, and ownership of the property was transferred to the Army in 1958. Since that time, it has been used to produce electronic components of missiles, including guidance systems for the Nike Hercules and the Nike Zeus. In 1976, the Army acquired the Stratford Army Engine Plant from the Air Force, which it has since used as a GOCO facility to manufacture aircraft engines.[93]

5.3.2 Depots

Storage and maintenance functions were typically performed at Army depots, which have been an essential component of the logistical systems throughout Army history. Most of today's depots originated in the rapid mobilization of the World War II era, with a few installations dating earlier or later.

The World War II depots could be divided into ammunition and general supply depots. The ammunition depots, which were all operated by the Ordnance Department, consisted primarily of barrel-shaped concrete structures (commonly termed igloos), specially designed to contain explosions. They occupied immense amounts of land to provide the proper dispersion of explosives. Supply depots, which stored nonexplosive materiel, resembled conventional warehouse complexes and typically occupied far less space than the ammunition depots. They were usually connected to both rail and road transportation networks.

For the most part, the Army relied on the existing World War II system of depots through the Cold War. Nevertheless, some depots were constructed during the Cold War era. The Tobyhanna Signal Corps Depot, which has become the Army's center to repair and overhaul communications and electronics equipment, was constructed in 1953. In 1961, the Army opened the Corpus Christi Army Depot, which specialized in storage and overhaul of helicopters.

During World War II, depots were used primarily to store either ammunition or general materiel prior to overseas shipment. During the Cold War era, however, the emphasis gradually shifted from storage to overhaul and depot-level maintenance. To extend the useful life of vehicles and equipment, the Army began to use depots for complete overhauls, wherein vehicles or equipment would be refurbished to the original specifications. In 1956, Letterkenny Army Depot opened a vehicle rebuild facility for trucks and other large vehicles. In 1966, Atlanta Army Depot specialized in overhauling engineer equipment, while Anniston Army Depot specialized in overhauling ordnance equipment.

During the 1980s, with the need for improved distribution capability, Army depots began to construct modern packing and shipping facilities. For example, Defense Distribution East (formerly New Cumberland Army Depot) has a highly modern building for packing, labeling, and shipping containers.

Maintenance depots have extensive and sophisticated overhaul facilities, which vary depending on the commodity maintained at the depot. They also contain storage buildings, with

access to transportation networks. Depots that originated as Ordnance Department depots during World War II frequently contain extensive networks of ammunition storage buildings or "igloos." Depots such as Letterkenny still combine an ammunition storage mission with depot-level maintenance.

During the Cold War, two types of depots evolved to store chemical and nuclear weapons. Ever since World War II, Tooele Army Depot served as the Army's storage site for chemical weapons and it continued in that role during the Cold War. The isolated location in central Utah seemed best suited to storing these toxic substances. Moreover, the proximity to Dugway Proving Ground enabled greater cooperation between the two activities. The depot is characterized by large numbers of igloos used to store chemical munitions.

Storaging nuclear weapons proved to be a greater challenge. At first, the Department of Defense created special storage sites. One of the first was Killeen Base, constructed underground near Camp Hood (today Fort Hood), Texas. The limestone hills enabled the Army to build a network of tunnels to hide the nuclear munitions. It was heavily guarded and considered a secret installation.

Seneca Army Depot in New York and Sierra Army Depot in California have been used to store and renovate nuclear munitions. These facilities have been characterized by extensive security precautions and limited access.

5.4 AIR DEFENSE, BALLISTIC MISSILE DEFENSE, AND ARMY MISSILES

The Army's role in protecting the United States and its territories from Soviet air or missile attack constituted an important portion of the Army's history during the Cold War era. During the 1950s, air defense moved beyond antiaircraft guns to the Nike family of missiles. Later, the Army moved to a ballistic missile defense program that culminated in the Safeguard system. The research and development facilities used for air defense were also used for other Army rocket and missile programs. Details regarding the history of the Army's role in air and missile defense can be found in sections 4.1.5, 4.2.7, and 4.3.5.

5.4.1 Air Defense

During the late 1940s and early 1950s, as the threat of Soviet air attack first appeared, the Army deployed antiaircraft artillery, including the 75mm Skysweeper gun. Units lived and worked in improvised sites, often in tents. The portable nature of these batteries resulted in few, if any, physical remnants of their presence.

The introduction of guided missiles promised a more effective air defense and soon replaced the artillery defenses. The first guided missile, the Nike Ajax, was first deployed at Fort Meade, Maryland, in 1953. By 1954, 224 Nike Ajax batteries were deployed throughout the United States. Although a significant technological achievement, the missile's 25-mile range, vacuum tube electronics, and liquid fuel propulsion limited its range and reliability.[94]

The Nike Hercules offered a more powerful alternative for air defense. Its solid fuel propulsion and solid state electronics increased its reliability. The Hercules had a 100-mile radius,

a substantial increase over the Ajax. Unlike the Ajax, the Hercules could use a nuclear warhead to break-up massed bomber attacks. The first Hercules battery was deployed near Chicago in 1958; thereafter, batteries were installed throughout the nation.[95]

In their mature form, Nike batteries used widely separated launch and control facilities. The launch facility contained one or more underground magazines, a loading/fueling area, launch pad, and support buildings. To protect the site from possible attack, berms were constructed around the launch facilities. Missiles were brought up from the underground magazines to be placed in the launcher and then fired. The control portion of the site was normally placed at least one mile from the launch facilities, on the highest ground available. It contained three radars for target acquisition, target tracking, and missile tracking. The control site usually served as the battery administrative area, with barracks and headquarters buildings. Places defended by the Nike system included cities and military installations. Typically, the batteries formed a defensive ring around the area[96]

5.4.2 Ballistic Missile Defense

As the threat from Soviet ballistic missiles surpassed the threat from aircraft, the Army turned its attention to an ABM system. Although the possibilities of sending a nuclear armed missile into the path of an incoming missile seemed technically feasible by the 1960s, political considerations prevented full deployment of an ABM system. It was feared that developing a defensive system would only lead to more Soviet offensive weapons and hence escalate the arms race. In 1972, a treaty with the Soviet Union limited both nations to only two ABM sites. However, Congress only authorized one site near Grand Forks, North Dakota (the Stanley R. Mickelson site), and it was only operational for five months in 1975. Future work on ABM was limited to research and development.[97]

Although the Grand Forks site is no longer operational, it is still owned by the Army. The main command and control structure is a pyramid-shaped building, with a large, phased array radar antenna. The intermediate-range site contained silos for launching 30 Spartan missiles, which were the system's long-range interceptor, and 15 silos for Sprint missiles, which were the system's short-range missile system. Four nearby missile fields housed another 55 Sprint missiles. Associated support buildings were located near the main control building.

5.4.3 Research and Development

Research and development facilities constitute a vital portion of the historic heritage associated with the Army's air defense mission. The same real property played a critical role in other Army work with rocketry, including the Army's intermediate-range missiles, and its contribution to the space program.

Huntsville, Alabama, has long been the center of Army research and development for rockets and missiles. During World War II, Huntsville Arsenal produced chemical munitions, while the adjacent Redstone Arsenal loaded these chemicals into shells. The dangers from chemical munitions required that buildings be widely dispersed and that this dispersion suit the safety requirements for rockets and missiles. In 1949, the Ordnance Department combined Redstone with Huntsville Arsenal and designated the enlarged Redstone Arsenal as its research

center for rockets and missiles.

The technological achievements of Redstone's personnel have been impressive and include developing the Army's first intermediate-range missiles, such as the Redstone rocket. Engineers from Redstone designed the nation's first successful satellite, the Explorer, which was launched during the months following the launch of the Soviet Sputnik satellite. Shortly afterwards, NASA established the George Marshall Space Flight Center at the Redstone installation as part of an effort to place the space program under civilian control. Throughout the Cold War era, Redstone's personnel contributed to every Army advance in missiles and rockets. A test stand that is now within the Marshall Space Flight Center is listed on the National Register.

The facilities at Redstone Arsenal include static test platforms and other equipment for testing rockets. Redstone arsenal also contains a large number of laboratory buildings for conducting smaller- scale experiments in rocketry. The office buildings have historically provided the space for administration and planning used in developing the Army's early rocket and missile programs and they are still used for that purpose. Although a large portion of the installation was transferred to NASA, the Army portion retains much of the original property associated with the early days of rocketry.[98]

The Kwajalein Atoll, located in the central Pacific, is another important research and development facility for missiles and ballistic missile defense. During the early years of the Cold War, the Navy used Kwajalein as a support base for its nuclear testing at Bikini Atoll, and, following completion of these tests, the island became surplus. The Army used the island as a part of its missile testing complex. From 1959 to 1962, Kwajalein facilities, which played an important role in the early development of ABM programs, were the site for the initial tests of the Nike Zeus.

During the Cold War, Kwajalein evolved into one of the principal facilities of the Defense Department's Pacific Missile Range. Today, it operates in conjunction with the Navy's base at Point Magu and Vandenberg Air Force Base, both in California. The sophisticated radar and instrumentation facilities track missiles at the terminal stages of their flights, an arrangement that has proved to be well suited for developing new methods of ballistic missile defense.[99]

White Sands Proving Ground, New Mexico, is another facility associated with the Army's missile development. From its earliest development, the site has served as a testing ground for Army missiles. Its extensive range areas allow the test firing of intermediate-range missiles. It is the largest U.S. missile range that is entirely over land and has been used by all services to test fire their missiles. The addition of launch facilities at Green River, Utah; Mountain Home, Idaho; and Gallup, New Mexico, has extended the range of missiles tested at White Sands. Today the installation's advanced tracking and instrumentation facilities include more than 1,000 precisely surveyed instrumentation sites and more than 700 optical and electronic instrument buildings for tracking and testing missiles.[100]

White Sands retains many of the properties used during its early days as the site of pioneer work in rocketry. The first scientists used bunkers to observe missile launches and to track the flights with theodolites on specially constructed platforms. The installation also has the launch pad for the early V-2 rocket launches, berms used to protect the instrumentation near the target areas,

and a climatic chamber for controlled testing of missile components under extreme conditions.[101]

5.5 COMMAND AND CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE

As they became more sophisticated, communications and electronics became steadily more important to the Army throughout the 20th century. Today's communications function on both a tactical (battlefield) and strategic (global) level, allowing commanders to command and control the units within their charge. Computer technology has multiplied the potential for electronics to assist commanders by managing information. During the 20th century, intelligence and counter-intelligence functions have been closely connected to communications and electronics because intercepted message traffic is a lucrative source of information. Detail regarding these topics as they pertain to the Army during the Cold War can be found in sections 4.1.10, 4.2.6, and 4.3.4.

The Cold War era brought an increase in the scope and intensity of communications and intelligence efforts. Because of the United States' global commitments, the Army needed to maintain active communications and intelligence capabilities that could respond to crises anywhere the world. The possibility of war on short notice required that communications and intelligence units be capable of performing their missions at any time. Because of the possibility of nuclear war, the Army maintained communications capabilities that were designed to function even during an exchange of atomic weapons. The U.S. Army's ability to meet the communications and intelligence demands of the Cold War constituted an essential part of its overall viability as a fighting force.

5.5.1 Communications

The ability to manage communications and electronics has become increasingly important to an Army that has assumed global responsibilities. Until 1962, all communications and electronics were managed by the Signal Corps, but with the reorganization during that year, communications responsibilities were divided between Army Materiel Command for logistics, Continental Army Command for schools, and the Army Strategic Communications Command (later the Army Communications Command) for operating communications systems.

The mission of the Army Strategic Communications Command was to operate the global communications system, which required units and personnel scattered throughout the world. Within the United States, the command worked in cooperation with the other services and commercial communications networks to create a Defense Communications System. For overseas communications, the command used a combination of radio stations and satellite links, which were located primarily in Europe until the onset of the Vietnam conflict.[102]

With the growing complexity of computers and information systems, the Communications Command was renamed the Information Systems Command in keeping with an expanded mission of managing all Army information systems, especially with regard to computers and computer interoperability.[103]

For communications during a nuclear war or similar national emergency, the Army worked in conjunction with the other services and government agencies to create secret command posts.

Located beneath the mountains of western Virginia and Maryland, these sites required extensive communications support in an environment that is hardened for nuclear warfare, including electronic disruptions to communications. One such site, named Site R, is located near Fort Ritchie, Maryland, in the Catoctin Mountains.

5.5.2 Intelligence

Military intelligence involves collecting information about a real or potential adversary's capabilities and possible intentions. Information is derived principally from intercepting communications (called electronic or signal intelligence) or other means (called human intelligence). Human intelligence includes human agents, prisoner interrogations, captured documents, aerial reconnaissance, and other means of gathering information.

The property associated with electronic intelligence evolved from the achievements of American and British analysts during World War II. With the transition to the Cold War, installations that were associated with signals intelligence were transferred to theASA, which was responsible for electronic intelligence. Arlington Hall, Virginia, a former girls finishing school used for codebreaking, became the ASA's headquarters. Vint Hill Farms, a site of a vast antennae array used to intercept enemy communications, became the anchor for the ASA chain of field stations. In 1987, it was transferred to the AMC, to conduct research into electronic intelligence and electronic warfare. The ASA school for cryptographic analysis was moved to Fort Devens, Massachusetts, and later to Fort Huachuca, Arizona.

For human intelligence, the Army established military intelligence units within the Army. These personnel were trained at a school in Fort Holabird, Maryland, which was moved to Fort Huachuca, Arizona in 1974. Aside from school facilities, property associated with human intelligence consisted of unit administration buildings and associated buildings. Frequently, these buildings do not have windows for security reasons.[104]

5.6 THE ARMY SCHOOL SYSTEM

Writing in 1995, General Edward Meyer, the Chief of Staff during the Carter administration, noted that the most important task of a peacetime Army was training. To compensate for the quantitative superiority of the Warsaw Pact forces, the United States relied on a qualitative edge for both personnel and equipment. The Army has needed soldiers able to perform their jobs under conditions of both danger and uncertainty, which requires a high degree of training. In fact, the AirLand Battle doctrine is predicated on the assumption that U.S. soldiers will be trained to function under the most demanding circumstances. The increased reliance on technologically sophisticated equipment has further advanced the need for a well-developed training system that can teach soldiers to use and maintain the equipment. The ultimate success of the United States and its allies during the Cold War was largely due to the perception by the Warsaw Pact that NATO forces were capable of engaging a numerically superior foe. The Army school system contributed to that outcome. Today, the Army school system is under TRADOC. Its evolution is described in sections 4.1.9, 4.2.1, 4.2.9 and 4.3.2.

The preponderance of Army schools are branch specific. That is, an officer or enlisted member enters a career field that seldom changes during the course of the soldier's career. Each school operates courses for all company grade officers and NCOs within the branch, as well as specialized courses for specific skills. In addition to the resident instruction, each school prepares nonresident instruction packages, develops or provides input into Army doctrine, and reviews materiel requirements for the Army.

Other schools provide instruction regardless of branch. The Command and General Staff College at Fort Leavenworth offers advanced training to field grade (midlevel) officers of almost all branches, either through resident instruction or correspondence courses. The Army War College provides advanced instruction to senior officers, while the Army Logistics Management College is the senior school for logisticians.[105]

Because TRADOC schools are responsible for providing specialized training, they often contain mock-up facilities to duplicate conditions that soldiers might encounter. The Transportation School at Fort Eustis has a mock-up of a bulk-break cargo ship to train stevedores in the proper loading of ships and a beach to train in moving supplies over a shore. The Quartermaster School at Fort Lee has a small bulk petroleum facility with storage tanks and a pipeline system. The Military Police School has a mock prisoner-of-war camp to teach proper procedures for holding POWs. The Aviation School at Fort Rucker uses flight simulators for added safety and reduced cost. All of these facilities and others perform an essential role in the Army's overall readiness for combat around the world.

The branch schools have typically maintained a large classroom and administrative building at each post to be the center of educational activities. In addition to furnishing the majority of the classroom instruction, this building provides office space to staff and faculty, and serves as the commandant's headquarters. A few central classroom buildings may contain distinctive feature resulting from the nature of the Cold War Army. For example, Knox Hall, located at the Artillery School in Fort Sill, is a square, windowless building, designed specifically to teach missile operations. The design provided for better security and allowed space for the

large computers of the early Cold War era. The usual TRADOC post also contains a variety of small instructional and administrative buildings to incorporate the variety of associated functions, including developing materiel, writing doctrine, and preparing instructional materials.

Outside of the cantonment areas, the typical TRADOC installation contains the facilities for field training. The size and extent of these facilities varies depending upon the nature of the school. For example, the Army War College has no field training areas, whereas basic training installations or branch schools for the combat arms contain extensive range complexes and training areas. Most branch schools contain or have access to small arms ranges, bivouac areas, and small unit maneuver areas. They also contain some specialized structures for outdoor training, which include rappelling towers, obstacle courses, and buildings for training with a gas mask. Training areas for the combat arms are tailored to the specific branch. Not surprisingly, the Artillery School contains an extensive artillery range, while the Armor School has an extensive tank gunnery complex, with suitable maneuver areas.

With the increasing sophistication of computers during the Cold War era, the Army has increased its emphasis on computer simulation. Computers provide more effective training at a lower cost for many purposes. Computer simulation facilities can take two forms. The first is for war games or hypothetical maneuvers conducted in a classroom environment using maps and computer terminals. Computer simulations measure probable outcomes of maneuvers, monitor the support elements, and enhance communications. The second form of computer simulation provides a cheaper alternative to training on real equipment by simulating, for instance, the functioning of an M-1 tank or an aircraft, without the expenses of fuel and maintenance.

Throughout the Cold War era, the Army school system played an essential role in producing a credible conventional force deterrent to communist advances. By providing individual soldiers with the skills and the training, the school system provided a qualitative edge for U.S. fighting forces to counter Warsaw Pact and other communist forces. The improved sophistication of modern weapons and equipment, especially the electronic components, has increased the demand for technically well-trained soldiers. Similarly, the fast pace and high lethality of a modern battlefield has required soldiers who are tactically proficient. Through its doctrinal development functions, TRADOC has made other contributions to the readiness of the U.S. Army.

5.7 OPERATIONAL FORCES

The Army's operational forces constitute the real fighting capabilities of the U.S. Army. During the Cold War era, these forces supported the United States commitments to NATO, the Pacific rim, and elsewhere. Forces based overseas were to provide an immediate response to communist advances, while forces based in the United States, including reserve components, were to be ready for expeditious deployment in the event of war. The nature of the Cold War required that the Army maintain its operational forces in a high state of readiness, without the luxury of lengthy preparations afforded in previous conflicts.

These operational forces were responsible for the successes and failures of the Army as discussed in chapter 4.0. They served in Europe as part of the NATO commitments and comprised a principal component of the allied policy of flexible response. The readiness and capabilities of operational forces has been a focal point of the other functions discussed within

these themes. All materiel development, wholesale logistics, schools, communications and intelligence, medical, and transportation support have been aimed at ensuring that American soldiers are equipped, trained, and otherwise supported to deter or engage potential adversaries, especially the Warsaw Pact forces.

For the purposes of this study, operational forces includes active component Army, Army Reserve, and Army National Guard. The latter two components are collectively termed the Reserve components. In keeping with the Army's mission of providing ground forces wherever required, these forces are fully deployable; that is, they are capable of moving with their equipment into a theater of operations to perform their designated function. Although combat units, including infantry, armor, artillery, air defense, special forces, and aviation, constitute a large and very visible portion of the Army's operational forces, supporting forces are equally important to the success of an operation. Supporting functions include logistics, engineering, communications, personnel management, and finance, which are all necessary to perform in combat. An army at war also requires professional services including legal and chaplain assistance. Medical units that deploy with the maneuver forces are also considered to be operational forces for the purposes of this study.

At the close of World War II, the Army's operational forces within the continental United States were under the supervision of the Army Field Forces. In 1955, the Army created CONARC to command both operational forces and Army schools within the United States. That arrangement lasted until 1973, when CONARC was divided into TRADOC and FORSCOM.

Today, FORSCOM commands active Army units within the continental United States, while the U.S. Army Pacific commands forces within Alaska, Hawaii, and the Pacific Islands. Army Reserve units are command by the U.S. Army Reserve Command, a subordinate command of FORSCOM. In peacetime, National Guard units are commanded by the state governors, with FORSCOM providing training oversight.

These operational forces have formed the pool of available units to move to a crisis in Europe or elsewhere. For example, throughout most of the Cold War, the primary mission of the 1st Infantry Division, located at Fort Riley, was to reinforce the VII Corps in Europe, although the division has been available for other duty, most notably in Vietnam. With its high degree of strategic mobility, the 82nd Airborne Division, located at Fort Bragg, has been designated for global deployment on short notice. The 82nd was used for crises in the Dominican Republic, Grenada, and Panama.

The typical FORSCOM post is designed as a garrison for line units. As such, it contains large numbers of barracks, family quarters, motor pools, administrative buildings, and other property that can be described as base operations. The remaining property consists primarily of training facilities. These facilities were constructed to improve individual proficiency and, more importantly, to enable operational units to train as a team in the tasks that they are expected to perform in a theater of operations. The major function of an Army unit during peacetime is to maintain its operational proficiency.

For routine training at a home station, the typical FORSCOM installation contains maneuver areas and ranges. In addition to bivouac and maneuver areas, an average installation

will have small arms, artillery, and tank firing ranges. Some, such as Fort Riley, built multipurpose ranges during the 1980s. These ranges allow for practice by artillery, vehicles, and aircraft. Most small arms ranges (e.g., rifle, pistol, machine gun) require the use of pop-up silhouettes as targets. Artillery ranges are surveyed to ensure that rounds will land within the impact area. Abandoned vehicles typically serve as targets. A FORSCOM installation may also contain such structures as obstacle courses, rappelling towers, or gas training facilities. During the Cold War era, the primary focus of training by FORSCOM units had been to counter potential communist foes. Some training devices illustrate this point more dramatically than others. Tank gunnery ranges, for example, may use silhouettes of Warsaw Pact vehicles as targets. A few small arms ranges have used targets that resemble Soviet soldiers.

Airborne and airmobile divisions require special training equipment. Consequently, Fort Bragg, home of the 82nd Airborne Division and XVIII Airborne Corps, contains structures to practice aircraft exits and parachute landings. It also has numerous drop zones for parachute jumps. Fort Campbell, home of the 101st Division (Airmobile), operates the Army's Air Assault School to develop the specialized techniques used with helicopter warfare.

During the Vietnam era, many installations contained mock Vietnamese villages, although none are believed to be extant. During the 1980s, the Army constructed imitation German towns, in the expectation that a defense of West Germany would require fighting in an urban environment. Created to replicate the winding streets and general layout of a European community, these areas were designated Military Operations in Urban Terrain (MOUT) sites.

Fort Irwin, California, deserves a special mention as a training ground for Army units. During the mid-1970s, Army leaders became concerned that the limited training space on most Army installations prevented brigade-size units from conducting maneuvers in open terrain. The problem was especially acute for heavy units, that is armor and mechanized infantry upon which the NATO forces relied. In 1976, therefore, the Army reactivated Fort Irwin in the California desert and designated it the National Training Center. The vast expanse of territory offers sufficient room to maneuver, and the hills enable units to take advantage of the terrain. To add realism, the Army uses a specially trained cadre of opposing forces (OPFOR). During the Cold War, the OPFOR soldiers received intensive indoctrination in Soviet tactics, while the exterior of their equipment was modified to resemble Soviet vehicles.

The instrumentation at Fort Irwin adds to the realism of the training. Units use a system in which lasers simulate rounds fired. A vehicle "hit" by the laser is placed out of action. Instruments on the ground record the progress of the battles, and the data is fed to receiving stations. At the end of the maneuvers, the unit commander receives a detailed assessment of his unit's strengths and weaknesses, as measured by the recording equipment on the ranges. The results are considerably more accurate than the previous method of assigning umpires to judge the outcome of battles.[106]

The training at Fort Irwin proved to be so successful that the Army established a joint readiness training center at Fort Chaffee, Arkansas, during the mid-1980s. The purpose of this center was to provide comparable training to light infantry forces.

5.8 ARMY MEDICAL ACTIVITIES

Under the direction of the Office of the Surgeon General, the Army medical establishment has played an essential role in preserving the fighting strength of the U.S. Army. The health of its soldiers is a concern to any army, and the U.S. Army during the Cold War era was no exception.

Medical laboratories played an important role because of their importance to medical science in general and in protecting the fighting forces during the Cold War era. The work of Army medical research has incorporated all military aspects of human biology. It includes treating wounds, injuries, and burns, as well as preventive medicine; aeronautical medicine; and the effects of stress, fatigue, and the like on the combat soldier.

In today's Army, the medical laboratories are under the command of the U.S. Army Medical Research and Materiel Command, which is a subordinate command of the U.S. Army Medical Department. Headquartered at Fort Detrick, Maryland, the command operates seven medical laboratories within the United States:

1. U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, Maryland, was originally a subordinate activity of the Walter Reed Army Medical Center, but it was assigned to the Army Medical Research and Development Command in 1958. Its present facilities, among the most modern in the world, were constructed in 1971. This laboratory develops medical defenses against both potential biological weapons and naturally occurring infectious diseases. It also works in cooperation with the World Health Organization and the Centers for Disease Control to counter outbreaks of infectious diseases.

2. Walter Reed Institute of Research, Walter Reed Army Medical Center, Washington, D.C., was founded in 1893. Scientists there investigate a wide variety of military-related medical issues, including nuclear, biological, and chemical defense; the effects of microwave irradiation; communicable diseases; immunizations; combat surgery; combat psychiatry; and drug development.

3. The U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, Maryland, was placed under the command of the Army Medical Department as a separate laboratory in 1979. There the Army develops and tests methods to prevent and treat both chemical and biological warfare attacks. Protective measures include both protective clothing, breathing apparatus, and the like, as well as methods of decontamination after a chemical attack.

4. The U.S. Army Biomedical Research and Development Laboratory, Fort Detrick, Maryland, was established in 1972 with the merger of the Medical Equipment Research and Development Laboratory with the Medical Biomechanical Research Laboratory. It specializes in research related to environmental medicine. Its work includes pest control, field sanitation, occupational medicine, and environmental safety.

5. The U.S. Army Aeromedical Research Laboratory, Fort Rucker, Alabama, conducts research into the medical aspects of military aviation, especially regarding air crew of rotary wing aircraft. Specific areas of research include acoustics, vision crew workload, stress and fatigue, effects of vibrations, and life support systems. It controls four aircraft equipped for in-flight assessment of air crew members. It also owns a flight simulator designed to duplicate a Black Hawk helicopter.

6. The U.S. Army Research Institute of Environmental Medicine, Natick, Massachusetts, conducts research on the effects of the environment upon soldiers, especially in extreme climatic conditions. It studies the effects of heat, cold, and altitude on the soldiers, and develops equipment or medical doctrine to maintain soldiers' effectiveness.

7. The U.S. Army Institute of Surgical Research, Fort Sam Houston, Texas, is located at the Brooke Army Medical Center. This activity conducts research into trauma treatment, including the transportation of trauma victims. In anticipation of the large number of burn casualties in modern warfare, especially nuclear warfare, the institute has developed a world-renowned reputation as an advanced facility for the treatment of burn injuries.

5.9 MISCELLANEOUS THEMES

5.9.1 Nuclear Power Program

Starting in the early 1950s, Army leaders began to consider the problems associated with providing electrical power to remote locations. Arctic regions in particular were considered essential to national security because of the possibility of Soviet air attack across the North Pole and the use of northern routes to move from America to Europe. The Air Force constructed a series of radar stations in the Arctic known as the Distant Early Warning (DEW) line, with the Army assuming responsibility for logistical support, including electrical power. Operations in the arctic presented special logistical challenges, especially with regard to moving large quantities of supplies to remote regions. If the services could find a way to minimize the movement of fuel into remote sites, they could substantially ease the logistical burden.

Nuclear energy appeared to offer the best solution to this problem. If the Army could construct small-scale nuclear power plants at remote locations, it could avoid the necessity of transporting large quantities of fossil fuels. Consideration of the nuclear power option began in 1952, with a recommendation to construct a prototype plant within the United States, to be followed by operational units at remote locations. Construction of the prototype began at Fort Belvoir in 1955. The prototype plant became operational in 1957 and underwent a successful six-month trial period. The U.S. Army Corps of Engineers then constructed an operational plant at Fort Greeley, Alaska. Following the success of these efforts, the Army experimented with an number of smaller and semiportable reactors, all designed to support remote locations in Alaska, Greenland, and the Antarctic.

The principal purpose of the Army's nuclear reactor program was to provide electricity for radar operations in the Arctic along the DEW line. As such, the program was important to the defenses against Soviet aircraft. As the Soviet missiles replaced bombers during the 1960s, the DEW line lost its military significance. As the Air Force gradually closed its radar stations, the Army no longer was required to support the remote Arctic locations. The number of reactors diminished until the only reactor in operation was the prototype reactor at Fort Belvoir, which existed only as a training aid. Without operational reactors, there was no need for a training facility. Consequently the Army closed the Fort Belvoir reactor in 1973 and converted it into a museum.[107] Presently the site has been nominated for the National Register of Historic Places.

5.9.2 Army Aviation

Even after the creation of the Air Force in 1947, the Army found that it required some aviation capability for functions directly related to ground operations, such as conducting reconnaissance or spotting artillery support. Consequently, it retained some light aircraft in its inventory. Although early models of the helicopter appeared during the later years of World War II, the first militarily useful models were developed during the early 1950s. Army officers found the helicopter to be exceptionally well suited for its needs. It could perform reconnaissance or move soldiers over the battlefield with unusual speed and ease. Later, Army aviators found ways to use helicopters as gunships or as air ambulances. The emergence of Army aviation is discussed in section 4.1.6.

Today, most Army installations have an airfield of some type, depending on the installation's size and mission. The Army airfield typically includes a runway or landing field, hangers, control towers, and refueling facilities. Depending on the size and mission, it may include other types of property.

Fort Rucker, Alabama, ranks as the premier Army installation associated with Army aviation. Since 1954, it has been the home to the Army Aviation School where student aviators have learned to fly military helicopters. Its Hanchey and Lowe fields have been associated with aviation training for thousands of Army personnel. Fort Rucker has also been the site for work in developing the potential of Army aviation. During the late 1950s, Army aviators performed the first experiments with mounting rockets and armament upon helicopters. Today, Fort Rucker is the site of the Aviation Development Test Activity, an AMC activity, and the Aeromedical Research Laboratory, a Medical Department Laboratory.

5.9.3 Activities Associated with Other Services or Department of Defense Agencies

Many Army installations have buildings or structures whose history is associated with other services or other Department of Defense Activities. These buildings must be studied independently to understand their contribution and proper place in history and must be documented under other contexts, as the Army Cold War context is not relevant in understanding their historic contribution. Some Army installations were once entirely owned by other services. Examples include such places as the Military Ocean Terminals in Bayonne, New Jersey, and Oakland, California, that were associated with the Navy during World War II, or a large concrete building at Fort Lee, Virginia, that was associated with the Air Force defenses of the United

States.

6.0 PROPERTY TYPES ASSOCIATED WITH THE U.S. ARMY DURING THE COLD WAR.

This chapter discusses property types associated with the U.S. Army during the Cold War era. Property types are a wide range of resources such as buildings, structures, landscapes, sites, districts, and objects. They are not limited to exterior spaces. Interior features such as floor plans, equipment, and furnishings are included within the definition of the property types, as are objects such as rockets and computers. The property types discussed in this chapter are presented without regard to National Register of Historic Places eligibility, which is discussed in chapter 7.0 in this report.

U.S. Army property from the Cold War era can be organized into a single set of resources with two subsets. For the purposes of this study, the single set of resources is all real property developed by the Army from 1946 to 1989. The two subsets are (1) those properties that were developed solely as a result of the military-industrial history of the Cold War and are, therefore, directly related to that contextual history of the Army and (2) properties that would have been developed even if the Cold War had not occurred, but that, nonetheless, relate to the Cold War.

For the purposes of this study, properties in the first subset---those that are directly related to the Cold War Military-Industrial context---are defined as ones that meet any or all of the following qualifications:

1. They were specifically constructed or used prior to 1989 to

   - Meet the perceived Soviet/communist military threat;
   - Project a force designed to influence Soviet policy; and
   - Affect global opinion of the relationship between the superpowers.

2. Through their architectural or engineering design, they clearly reflect one of the Cold War themes, as described in chapter 5.0.

3. They are directly related to the United States/Soviet relationship through association with a milestone event of the period.

4. They are directly related to a United States/Soviet relationship through association with the life of a person during the Cold War period.

All Army property from the Cold War period that does not fit into the definition of a Cold War Military-Industrial property was developed

1. Within the context of standard Army development, which would have occurred whether or not the Cold War had taken place (for instance, the construction of administrative offices),

2. Within another Army Cold War context, such as the increase in housing construction that occurred as a result of increased size of the Army, or

3. Within a context not originally related to the Army, such as the Navy during the Cold War (some Navy Cold War properties have been transferred to the Army).

U.S. Army property types evolved with the changing missions of the installations and their tenant activities. For instance, posts that at the commencement of the Cold War era were garrisons for line units may have changed into schools or vice versa. At other installations, while the missions may not have changed, the technology for implementing them did. Consequently, U.S. Army property can also be organized by function. This type of categorization is perhaps the most useful because it is based on how the structures were used and is similar to how Army real property records are sometimes organized. The types of properties found at a particular installation will depend on that installation's present or past function.

This chapter organizes identical property types three different ways. Section 6.1 presents property types by theme and generally follows the organization of chapter 5.0, where more detailed information about the theme can be found. Section 6.2 is organized by command and facility type within the command. In section 6.3, property types are listed alphabetically within an alphabetically organized list of facility types.

All of the sections include properties used by the Army during the Cold War era, whether they are directly related to the military-industrial effort or to other efforts. The context of the property type is clearly noted so that cultural resources professionals will be able to evaluate the resources within the proper context. The great majority of buildings erected by the Army during the Cold War period are related to troop and employee support (base operations (BASOPS)). Because these resources would have been built (although perhaps not in the same quantity) as part of the normal evolution of the Army, they are not considered to be related to the Cold War military-industrial context discussed in this document. They are listed here (1) to provide the overall context of Army property development during the Cold War period and (2) to provide a more specific guide for installation cultural resources managers for what is excluded from the Army Cold War Military-Industrial Historic Context, and must, therefore be evaluated under other contexts, such as Army Housing.

This chapter is based on secondary research and, while it is extensive, it is not comprehensive. A comprehensive list will only be available once on-site surveys and inventories of the individual installations' Cold War-era resources are completed. On-site identification may be complicated because the study of Cold War resources is more complex than the study of older, more traditional buildings and structures. There are many reasons for this:

- Not enough time has passed to allow objective judgement.
- Sometimes there is a lack of understanding of what makes a property historic. Architectural attractiveness is often mistaken as the sole source of historical value.
- The Army is rapidly adjusting to meet post-Cold War missions and this adjustment is drastically affecting the configuration of its post-Cold War built environment.
- The time span and complexity of the context is enormous and unprecedented. The Cold War is the history of the world since 1945, sifting through it will take decades. Most other historic contexts (e.g., World War II covers a five-year period) are more manageable.

- The United States only has approximately half of the Cold War resources. The countries of the former Soviet block have most of the rest, and very little is known about them.
- A large percentage of properties are highly scientific in nature and unlike traditional properties. A Cold War property is not as easily evaluated as a post commander's quarters.
- Cultural resource personnel (installation level, contractors, and SHPOs) are often unfamiliar with Cold War resources. When encountering them for the first time, everything either seems exceptional because they have not seen many, or, conversely, nothing seems exceptional because it is not old.
- Lack of a sufficient database of similar properties for comparison hinders evaluation.
- It is difficult to evaluate the integrity of the resources when many of them have undergone constant modification due to their high-technology emphasis.
- Wide variance in opinion on what is exceptional about the Cold War exists between professionals.
- The need for secrecy because of national security hinders identification and evaluation by limiting access to material needed for assessment.

Despite the difficulties associated with identifying Cold War resources, it can be done. Many studies have been prepared over the years on a variety of property types and technical assistance is available from several Army organizations such as the U. S. Army Environmental Center and the U.S. Army Construction Engineering Research Laboratories (USACERL).

6.1 PROPERTY TYPES ORGANIZED BY THEME

The following is a list of property types that may be found in the Army's inventory from the 1946 to 1989 period, including both property constructed during the Cold War and property that existed in 1946 and was used to support the Army's Cold War mission.

6.1.1 Basic Research

Basic research consisted of scientific and technological research related to military technology in general, not to specific types of weapons or equipment. It was a part of the Army's effort to gain military superiority over its potential adversaries through the use of technologically superior materiel.

Property associated with basic research included the Army's primary research laboratories. These facilities contributed to the Army long-term materiel readiness by advancing the base knowledge of military-related science and technology. In addition to supporting the Army's basic research, facilities also assisted other defense-related activities as appropriate.

Laboratory complexes varied widely due to the specific function of each installation. The Army has used the term "laboratory" to denote an activity with a specified mission, not a particular structure or building. Some laboratories resemble the popular concept of work spaces with precise measuring equipment, while others may consist of multiple buildings, or even outdoor research areas. Some laboratories were established as separate installations, while others operated as tenant activities on larger posts. Some examples of specific property types included the following:

- *Electronics laboratories.* These facilities resemble the more popular idea of specified building spaces and are used for conducting advanced research into communications, radar, digital electronics, and related equipment.

- *Other laboratories.* The Army uses laboratories for materials technology, metallurgy, and ballistics. The appearance of the buildings varies depending upon functions.

- *Computers.* Computers of various types and functions are used by almost all laboratories, Most of the older, pioneering computers are no longer extant, with only the buildings that house them remaining. Perhaps the most famous computer used by an Army laboratory was the ENIAC, one of the first computers, used by the Ballistics Research Laboratory.

- *Wind tunnels.* These are chambers that create high velocity winds and are used to test both ballistics and aviation equipment.

- *Observation and telemetry equipment.* Whenever Army researchers conduct outdoor testing, they require specialized equipment. Telemetry equipment is designed to measure the performance of an object while transmitting the data to a fixed point. Observation platforms are designed for precise measurements.

- *The Electronic pulse simulator (Aurora).* This device created an electromagnetic pulse similar to one created during a nuclear explosion. It was located at the Harry Diamond Laboratories and used to test shielding of electronic components until it was disassembled in 1996. An electromagnetic pulse is a wave of electronic magnetic

energy created by a nuclear device that can disrupt communications and electronics equipment.

- *Support facilities.* Laboratory complexes often include support facilities such as offices and administrative buildings.

6.1.2 Materiel Development

Materiel development is the process of transforming technology into specific applications, weapons, equipment, or other military uses (such as packaged food). During the Cold War, it constituted a part of the Army's overall effort to gain technological superiority over potential adversaries. Under the Army Materiel Command and its predecessor organizations (the technical services), the materiel development process provided the critical qualitative edge for combating numerically superior Warsaw Pact forces and other adversaries.

During the Cold War, materiel development typically operated through a combination of contracted research and in-house research. The AMC subordinate commands operated materiel development centers and proving grounds to generate and test the most advanced items of equipment.

At some locations the buildings housing equipment associated with materiel development are typical office buildings, noteworthy only for the specialized equipment inside. At other places, the buildings themselves incorporate some special architectural or engineering features to facilitate the necessary experiments. For example, the Natick Research and Development Center contains a rain tower that was used for duplicating rain in an outdoor setting. Its distinctive architecture is apparent to even the most casual observer. A full analysis of which buildings are noteworthy themselves and which are noteworthy only for the equipment inside will require field investigation.

Typical property types associated with materiel development during the Cold War era include the following:

- *Administrative buildings.* These are located at all sites and are used to support Army research and to coordinate contracting.

- *Climatic chambers.* Climatic chambers are specifically designed rooms that create extremes of temperature or humidity. Natick Research and Development Center contains a chamber, which was used to test personal equipment under arctic conditions, and a rain tower, to duplicate extensive wet conditions. White Sands Missile Range has a climatic chamber for testing missiles and components under extreme conditions. Dugway Proving Ground contains climatic chambers for simulating desert and tropical conditions to chemical munitions.

- *Other simulation facilities (mechanical).* In addition to climatic simulation, the materiel development process requires mechanical and environmental simulation to test how equipment can withstand battlefield conditions. The Keith Ware Simulation and Experimental Firing Center at Rock Island Arsenal contains

chambers designed to mimic motion and computers to analyze the results. Fort Huachua contains a facility for testing night vision equipment by simulating battlefield conditions.

- *Computer simulation devices.* As the potential for using computers to test battlefield equipment has improved, the Army has increased its use of computer simulation programs, often in conjunction with the climatic and mechanical simulation devices.

- *Anechoic chambers.* These are specially constructed facilities to minimize reverberations of noise or electrical emissions. They have been useful for research into electronic measures prevalent in modern warfare.

- *Weapons laboratories.* Although weapons laboratories existed well before the Cold War era, they were extensively modernized to test Cold War weapons. The Benet Laboratories at Watervliet Arsenal are used for advancing the technology related to artillery and heavy weapons. Laboratories at Picatinny Arsenal are used for research into ammunition.

- *The Engine test facility.* This facility is operated at the Tank Automotive RDE center, Warren, Michigan.

- *Electronics laboratories.* The Communications Electronics Command operates its own electronics laboratories with facilities at Fort Monmouth, Fort Belvoir, and Vint Hill Farms Station. The Fort Belvoir facility conducts research into night vision devices, while the Vint Hill Farms facility specializes in electronic warfare. The Aviation RDE Center also operates an avionics laboratory at Fort Monmouth for work relating to the electronic components of aircraft.

- *Static test stands for rockets and missiles.* Redstone Arsenal contains static test stands, with associated research facilities. Static test stands measure the thrust of a rocket propulsion system. Throughout the course of the Cold War, these facilities were used for materiel development on all aspects of the Army's missile programs.

- *Biological warfare research facilities.* Although the United States has renounced even the retaliatory use of biological weapons, Fort Detrick was once the site of research into biological warfare. Under the Army Medical Department, laboratories at Fort Detrick still conduct research into defensive measures against potential threat or use of biological weapons.

- *Calibrated firing ranges.* The Army's proving grounds use carefully surveyed firing ranges for sophisticated proof firing. These ranges are used for both experimental testing of models of weapons (artillery, tanks, small arms, etc.) as they are being developed and for test firing of existing models prior to acceptance into the Army.

- *Equipment for test firing missiles.* This type of property includes launch stands, impact areas, protected observation sites for both launch and impact, and telemetry stations. These are located primarily at White Sands Missile Range and its subordinate installations, and at Kwajalein Atoll. White Sands has been essential to the success of the Army's missile programs from the earliest days of Army missiles and is also noteworthy as the testing location for missiles belonging to the Navy, Air Force, and NASA. Facilities at the Kwajalein Atoll, which became increasingly important in the Army's research efforts for missiles and missile defense, consist of radar stations, launch pads, and tracking instruments.

- *Chemical weapons testing facilities.* Under TECOM, the Army has tested the use and effects of chemical weapons. Dugway Proving Ground facilities are used to create both chemical defense and deterrent capabilities and include outdoor and indoor testing activities.

- *Electronic testing facilities.* The Electronic Proving Ground at Fort Huachuca is used to test radios, radar, and other electronic equipment. Some distinctive types of property include an anechoic chamber that allows testing of electronic emissions and an underground Measurement Laboratory.

- *Outdoor testing environments.* The Army operates proving grounds in arctic, desert, and jungle environments to test equipment in the climatic extremes of each location. The arctic test center is at Fort Greeley, Alaska; the desert testing is at Yuma Proving Ground, Arizona; and the jungle facility is at Fort Clayton, Panama.

- *Remnants of prior development or testing activities.* Testing or development activities that have closed may have left distinctive property types at military installations. These include lead-lined buildings from Fort Lee's General Equipment Testing Activity, or Fort Belvoir's Engineer Proving Ground. Other installations, especially those associated with the former technical services, may contain remnants of older activities.

6.1.3 Wholesale Logistics

Wholesale logistics entails the production, storage, and maintenance of the materiel required for the Army to perform its Cold War function of deterring or defeating communist aggression through the use of conventional forces. It is an essential component of the Army's overall readiness.

For the purposes of this study, wholesale logistics property can be divided into production facilities and depots.

6.1.3.1 Production Facilities

During the Cold War, GOCO production facilities erected during World War II contributed to the materiel readiness of military forces by producing the weapons and ammunition

required to maintain a credible deterrent. Some are designated as arsenals and others as Army ammunition plants.

Typical examples of production facilities include the following:

- *Conventional ammunition production facilities.* These consist primarily of a base of GOCO plants that were constructed during World War II. Although some plants have been inactive and unchanged since World War II, others were active during the Cold War and were renovated during that period. One, the Mississippi Army Ammunition Plant, was constructed during the Cold War.

Army ammunition plants are characterized by widely dispersed production lines to prevent the spread of potential explosions. Each process typically requires a separate building, with covered conveyor systems connecting the buildings. In many cases, the exteriors were not altered during the Cold War, although the production lines were modernized.

- *Chemical ammunition production facilities.* Chemical ammunition includes both lethal agents and other munitions such as flame, smoke, pyrotechnics, and riot control agents (tear gas). During the Cold War era, the Army produced chemical agents at Pine Bluff Arsenal, Rocky Mountain Arsenal, and Newport Army Ammunition Plant. These installations consist of chemical process lines, plus the required administrative buildings. Edgewood Arsenal has small-scale production plants to refine the process.

- *Artillery production facilities.* The Army produces artillery tubes at its Watervliet Arsenal and (until 1962) Watertown Arsenal. The shops at Rock Island Arsenal also produced components of artillery such as recoil devices, until the arsenal gradually converted to a special order facility.

- Beginning in 1978, Watervliet Arsenal began an extensive modernization program, with the introduction of a modern factory to employ such processes as cold compression and spinning components to produce artillery barrels. Other portions of Watervliet were constructed before or during World War II and used during the Cold War.

- *Tank production facilities.* The Detroit Arsenal and Lima Army Tank Plant were both inherited from World War II. The Detroit Arsenal continued to produce tanks, including the M60 model until the early 1980s, with consequent modifications to its production lines. The Lima Army Tank Plant was renovated in 1976 to produce the new M1 tank, which it produced through the remainder of the Cold War.

The original tank factory was designed during World War II by the noted industrial architect Albert Kahn. It features a central assembly line with supporting production bays. Although the essential design of the plant has remained unchanged, the lines have been modified, and the glass walls have been replaced by opaque walls.

- *Special order facilities.* As the Cold War continued, some arsenals gradually turned away from production line operations to special orders. These might be pilot models or other equipment that required specialized skills. Rock Island Arsenal can still produce special orders of Army equipment. Picatinny Arsenal is now an RDE center, but did operate some limited production facilities for ammunition, especially for types of ammunition that were only created in small quantities. Springfield Armory produced small arms until its closure in 1968, while Frankford Arsenal performed the same function for optical control instruments until 1977. The architecture varies depending upon the installation.

- *Other production facilities.* Since 1976, the Stratford Army Engine Plant has operated as a GOCO to manufacture aircraft engines. The Tarheel Army Missile Plant is a GOCO producing electronic components of missiles, including guidance systems. Buildings at these installations are generally industrial in nature.

6.1.3.2 Depots

The Army's depot system has kept working equipment in the hands of its operational forces. It provides for storage of equipment and complete overhaul of used equipment. These functions protect the logistical readiness of the U.S. Army while attempting to minimize the cost. As such, the depot system played an essential role in preserving the Army's ability to deter or defeat communist aggression during the Cold War.

Like production facilities, the Army's depot system developed from the system that existed at the close of World War II. The Army depot system, however, has steadily shifted toward a greater emphasis upon maintenance and less emphasis upon storage. With the increase in maintenance came considerable new construction.

Today, the Army's supply depots are operated by the Defense Logistics Agency (DLA). As the land owner, however, the Department of the Army retains responsibility for complying with historical preservation requirements. Maintenance depots are operated under AMC by the Industrial Ordnance Command.

Typical types of property found within the depots include the following:

- *General purpose warehouse.* These are most commonly found on supply depots operated by DLA. They consist of warehouse space, typically with rail and truck connections.

- *Distribution facilities.* Some DLA depots, such as New Cumberland, contain modern facilities for packaging and shipping supplies to the using activity. An example of a typical distribution center is single building with conveyor systems to move supplies and suitable transportation connections.

- *Ammunition storage facilities.* For the most part, these are World War II era

igloos, which served the Army during the Cold War. Igloos are barrel shaped buildings designed to direct explosions upwards. The depots where these types of buildings are located are characterized by dispersal of storage buildings to prevent the spread of explosions. Consequently, they occupy large acres of land.

- *Maintenance facilities*. Depot maintenance buildings are used to refurbish an item to meet the original manufacturing specifications. They consist of large-scale maintenance structures, with required supporting capabilities, such as vehicle painting. They are industrial in nature, with the design varying according to their specific purpose.

- *Special ammunition storage and renovation*. Tooele Army Depot is the Army's site for storing and repairing chemical ammunition. Seneca Army Depot and Sierra Army Depot have performed the same function for nuclear ammunition until the Army discontinued production of tactical nuclear weapons. These installations contained heavily guarded facilities for storing and maintaining their respective forms of ammunition.

- *Older nuclear weapons storage facilities*. Remnants of the earliest nuclear weapons storage facilities exist at some Army posts that are not part of the Army Depot system. Fort Hood and Fort Campbell contain underground storage systems that were secret storage sites when the military first developed its nuclear weapons.

6.1.4 Air Defense and Ballistic Missile Defense

In contrast to its primary Cold War mission of deterring or fighting conventional wars, the Army continental air and ballistic missile defense missions functioned within the context of strategic nuclear war, that is an attack upon the United States by Soviet nuclear forces. The Army's mission was to operate surface-to-air missiles that would destroy incoming Soviet bombers and missiles.

Property types include the following:

- *Air Defense*. The typical property associated with continental air defense consisted of Nike Ajax or Nike Hercules batteries. During the 1950s and 1960s, these batteries were scattered across the United States near potential Soviet targets, such as major cities, military installations, and industrial facilities. Air defense sites used widely separated launch and control facilities. The launch facilities contained underground magazines, a loading/fueling area, and at least one launch pad. These facilities were constructed to protect the site from possible attack, including berms around the launch facilities. The control facilities contained at least three radar, for target acquisition, target tracking, and missile tracking. Control facilities also contained the battery barracks and headquarters.

- *Ballistic Missile Defense*. As the Army's ballistic missile defense program was

becoming operationally capable, a treaty between the Soviet Union and the United States severely limited the development of ballistic missile defense sites. Acting in the spirit of the treaty, Congress closed the only operational ABM site shortly after it became operationally capable.

- Today the Grand Forks (Stanley R. Mickelsen) ABM facility still belongs to the Department of the Army. It consists of a large, pyramid-shaped control building with a hexagon-shaped phased array radar along the walls. Outside of the building are silos for launching intercept missiles, which were intended to detonate a nuclear device in the vicinity of the incoming missile. The Grand Forks site has a set of inactive silos in the immediate vicinity, with four missile fields in the outlying areas.

- *Strategic Defense Initiative*. The concept of ballistic missile defense was revived during the Reagan administration with the SDI.

6.1.5 Command, Control, Communications, Computers, and Intelligence Facilities

Facilities associated with command, control, communications, computers, and intelligence support the Army's global (strategic) communications programs and its tactical communications programs. The Army also provides contingency support to the national command authority in the potential event of nuclear war. Intelligence facilities are used to intercept and analyze the communications of potential adversaries, as well as to collect other sources of information.

Typical types of property associated with communications and intelligence include the following:

- *Antennae arrays*. These can be used as communications stations or for intercepting communications traffic of potential adversaries.

- *Code breaking facilities*. These facilities are characterized by windowless buildings and space for large computers.

- *Contingency command and control facilities*. During the Cold War, the United States operated hidden command facilities within the United States, consisting of underground chambers with sophisticated communication capabilities to allow national leaders to direct the course of a nuclear war.

- *Installation communications facilities*. These are smaller facilities used for communications at an installation level.

6.1.6 The Army School System

As the prospect of combat with Warsaw Pact or other communist forces pervaded the Army's Cold War culture, Army leaders continuously sought means to confront a numerically superior foe. Training personnel became a principal means of ensuring a qualitative advantage.

As the Cold War progressed, training became increasingly important because weapons and equipment were becoming more technologically sophisticated.

To provide the soldiers with some appreciation of the working conditions of their assigned duties, schools have frequently constructed special-purpose mock-up facilities and specially constructed structures to meet their specific requirements. Some specific examples include the following:

- *Petroleum storage and pipelines.* At Fort Lee, the Quartermaster School has a mock-up of a petroleum pipeline and storage system. It contains storage tanks and a small pipeline system.

- *Prisoner of War confinement facility.* The former Military Police School at Fort McClellan contained a model Prisoner of War facility to teach future Military Police how to manage this aspect of their jobs.

- *Chemical School simulation facilities.* The former Chemical School at Fort McClellan contained a facility where radioactive material could be raised and lowered in a cement structure that would vary the background radiation levels, allowing students to use testing equipment. During the 1980s, the Chemical School constructed a chamber to train students by using live nerve agents and the standard protective equipment.

- *Stevedore training facilities.* The Transportation School, at Fort Eustis contains a mock-up of a break-bulk cargo ship, designed to train soldiers on the procedures for loading and unloading cargo.

- *Logistics over the shore (LOTS).* The Transportation School at Fort Eustis and its subinstallation at Fort Story contains beaches for soldiers to practice moving supplies from ships to unimproved beaches using lighters or amphibious vehicles. Like port operations, these techniques are essential to the Army's logistical support.

- *Maintenance training facilities.* The Ordnance School at Aberdeen Proving Ground contains simulated maintenance shops to teach future mechanics their trade.

- *Airborne Training.* The Airborne Department of the Infantry School at Fort Benning contains facilities to simulate different portions of a parachute jump. These include a 250-foot tower, where students are dropped using a parachute; 34-foot towers to simulate exit from an aircraft; swing landing trainers to teach the proper landing techniques; and various other types of equipment.

- *Flight simulators.* The aviation school at Fort Rucker contains flight simulators which mimic the cockpits of Army aircraft.

In addition to various unique devices, most posts within the TRADOC school system have some of the following commonly occurring property types:

- *Classroom and administration buildings.* The typical TRADOC post contains a large building that serves as the central classroom and administrative building with offices for the commander and staff. Depending upon the requirements of the installation, other classrooms may be located in adjacent areas. While most administrative buildings are not architecturally distinct from other types of administrative buildings, Knox Hall at Fort Sill is noteworthy because of its windowless architecture, necessary for security requirements.

- *Outdoor training devices.* Typical schools contain obstacle courses, towers to teach rappelling, and other structures for challenging soldiers and building confidence.

- *Small arms ranges.* Small arms, especially rifle, training is required of all soldiers (except chaplains and doctors). The typical TRADOC post contained or had access to, small arms ranges for rifle, pistol, and machine guns. Typically, these are outdoor facilities that use either fixed targets or "pop-up" silhouettes. Shooters fire from a line, taking instruction from a control tower. Rifle ranges often employ "foxholes," which are concrete-lined holes where the shooter can stand. The length of ranges varies from 50 meters for pistol ranges to approximately 500 meters for rifle ranges.

- *Large caliber ranges.* Large caliber weapons ranges vary according to nature of the school. The Artillery School at Fort Sill has extensive artillery ranges, while the Armor School at Fort Knox has extensive tank gunnery complexes. These are carefully surveyed areas with large impact areas. A tank gunnery range has course with silhouettes of Warsaw Pact vehicles.

- *Chemical training facilities.* Typically, these consist of small buildings away from the cantonment area. At these sites, students wearing protective equipment can be exposed to CS (a form of tear gas).

6.1.7 Operational Forces

The operational forces consist of active Army, Army Reserve, and Army National Guard units. Together these organizations constitute the base of combat and supporting forces that can be deployed into a theater of operations in the event of hostilities. Active Army forces are stationed within the United States and in areas of potential conflict, including Europe and Korea.

Real property associated with operational forces consists of a combination of base operations property, training facilities, and special purpose facilities. For the purpose of this study, it is sufficient to note that base operations types of property consist of barracks, office buildings, motor pools, unit maintenance activities, family housing, personnel support facilities, and related property types.

Training facilities consist, in large part, of outdoor facilities such as obstacle courses, rapelling towers, gas training facilities, small arms ranges, large caliber ranges, and maneuver areas. Although most training is conducted to simulate fighting a generic enemy, some types of property illustrate the predominate threat of Warsaw Pact forces during the Cold War era. For example, tank gunnery ranges use target silhouettes of Warsaw Pact vehicles. This pattern is in keeping with the Army's pattern of training to conduct operations against any potential adversary, while recognizing that the Warsaw Pact forces constituted the most formidable and most important threat during the Cold War, and even today many potential adversaries use Warsaw Pact equipment supplied by former Warsaw Pact nations.

In response to the need for better training for a European urban environment, the Army began constructing MOUT sites during the 1980s. These are cinder-block structures intended to mimic the general appearance of European towns, with winding streets and quasi-European style architecture.

The National Training Center was re-activated at Fort Irwin, in the California high desert in the 1970s. Battalions and brigades can practice their tactics in large, open areas. The hills surrounding the training areas contain small, unmanned towers that use televisions and telemetry equipment to track unit movements. Data is fed into a central computer facility. Other buildings at Fort Irwin consist primarily of prefabricated housing and administration buildings in a cantonment area.

6.1.8 Military Port Terminals

To be able to resupply overseas forces, the Army owns and operates ocean ports at Sunny Point, North Carolina; Bayonne, New Jersey; and Oakland, California. The Sunny Point terminal is equipped to handle bulk ammunition. Typical property associated with port terminals includes piers, railroad yards, dry docks, cranes, warehouses, and office buildings.

6.1.9 Army Medical Activities

Medical care is a vital aspect of military operations in any situation, and the Cold War Army was no exception. The Army's Medical Department provided for the care of soldiers and their dependents, for preventive medicine, and for protection against enemy weapons (whether conventional, chemical, biological, or nuclear). Most of the Army's medically-related real property consists of hospitals, clinics, and other patient treatment facilities, and thus is categorized as base operations property.

The laboratories operated by the Army Medical Department constitute an important Cold War resource that is not related to base operations. During the Cold War era, these were used or expanded to advance the Army's knowledge of how medical science could be applied to military

missions. The functions of each laboratory are discussed in section 5.8 and vary from aviation medicine to the prevention of infectious diseases.

Property types associated with each laboratory depend upon the nature of each laboratory. Some laboratories work in conjunction with patient treatment facilities. For example, the Army Institute of Surgical Research works in conjunction with Brooke Army Medical Center to advance the treatment of burn injuries by operating one of the premier burn treatment facilities within the United States. This particular program was inspired by the possibility of large numbers of burn injuries in nuclear warfare. The Aeromedical Research Laboratory at Fort Rucker uses aircraft and flight simulators equipped to monitor the condition of crew members.

6.1.10 Miscellaneous Themes

6.1.10.1 Nuclear Power Program

The Army's nuclear power program was designed primarily to service remote locations such as the arctic and antarctic regions. These consisted of small-scale nuclear reactions, complete with the characteristic dome, and a facility to operate a controlled nuclear reaction. The program terminated in 1973, when the training reactor at Fort Belvoir was closed and transformed into a museum. As of April 1997, a nomination for the National Register of Historic Places was in progress.

6.1.10.2 Army Aviation

Since the 1950s, Army aviation, consisting of both fixed and rotary wing aircraft, has been a fixture of Army tactics. Helicopters especially have offered a technological advantage that Army leaders eagerly employed. In addition to moving troops, helicopters can provide fire support (with specially designed aircraft such as the Cobra or Apache), perform reconnaissance, serve as air ambulances, serve as a command post, and perform a variety of other useful functions.

Typical property associated with Army aviation includes the following:

- *Airfields.* These typically contain a runway, a control tower, refueling facilities, and related structures.
- *Maintenance facilities.* These generally consist of hangars for repair of aircraft.
- *Research and Development activities.* As discussed in section 6.1.2, Army aviation was also the focus of research and development. Because it is discussed elsewhere, research and development is simply noted here.
- *Schools.* Schools are simply noted here, and discussed in section 6.1.6.

6.2 FACILITY TYPES ORGANIZED BY COMMAND

The following list is provided to assist in identifying the types of facilities that may be found at different commands. This list can be used in conjunction with the previous list, as well as

with chapter 5.0.

6.2.1 Army Materiel Command

6.2.1.1 Ammunition Plants

Most ammunitions plants were constructed during World War II, although one (the Mississippi Army Ammunition Plant) was constructed during the Cold War. Some have been renovated; others have seen very little use since the war. They are typically GOCO facilities. Throughout the Cold War, these facilities produced the conventional ammunition necessary for military operations. Since 1977, they have assumed responsibility for providing conventional ammunition to all the military services.

6.2.1.2 Arsenals and Other Industrial Facilities

Arsenals and other industrial facilities perform either production or limited specialized work (e.g., pilot models). For example, Watervliet Arsenal specializes in artillery tubes, while Picatinny Arsenal shifted from limited production of ammunition to a research and development center for conventional ammunition. Other arsenals, including Pine Bluff and Rocky Mountain Arsenals, have specialized in producing chemical munitions. The oldest arsenals date to the 19th century, although most had new construction during the Cold War. All were active in supporting the Cold War Army.

6.2.1.3 Depots

Most depots were constructed during World War II, although a few, such as Tobyhanna, were constructed during the Cold War. Today, AMC depots perform either storage or maintenance functions. Many depots have had extensive additions during the Cold War, usually to provide sophisticated maintenance and overhaul facilities. Some depots store or overhaul tactical nuclear ammunition. Supply depots are now operated by the DLA, although they are owned by the Army.

6.2.1.4 Laboratories

Laboratories operated under LABCOM until 1992 (they are now under the Army Research Laboratory) and performed generic research. The seven laboratories in 1988 included the Atmospheric Science Laboratory, Ballistic Research Laboratory, Electronics Technology and Devices Laboratory, Harry Diamond Laboratory, Human Engineering Lab, Materials Technology Laboratory, and the Vulnerability Assessment Laboratory. All but the Harry Diamond and Materials Technology Laboratories are located on other AMC installations.

6.2.1.5 Proving Grounds

Proving grounds, operated by TECOM, are used to test new types of equipment and to perform final acceptance testing for existing models of equipment. These installations typically include calibrated firing ranges or other sophisticated testing facilities.

6.2.1.6 Research, Development, and Engineering Centers

RDE centers conduct research in support of their parent commands within AMC, usually contracting out the bulk of the research. Some have specialized testing facilities, such as the climatic chamber at Natick RDE Center, the Engine test facility at the Automotive Research and Development Center, or the extensive rocket testing facilities at Redstone Arsenal.

6.2.1.7 Other AMC Property

AMC owns a variety of office complexes and support centers.

6.2.2 Forces Command

FORSCOM includes posts where operating forces of the Army are stationed. These include large posts where one or more divisions are stationed, such as Forts Hood and Riley, as well as smaller installations. Potential Cold War property related to FORSCOM includes facilities for training soldiers and related purposes. Typical examples of potential facility types include the following:

Aircraft Facilities (e.g., Runways, Hangars, Maintenance Facilities)
Artillery Ranges
Deployment and Troop Movement Facilities
Small Arms Ranges
Specialized Training Facilities
Tank Ranges
Unit Motor Pools and Maintenance Facilities

Resources that are generally not being evaluated under the Cold War military-industrial historic context include Troop and Employee Support (BASOPS) buildings and structures. These property types have been associated with the Army throughout its history and are not unique to the Cold War era. They must be evaluated under other contexts, such as Army Housing, Administration, or Transportation. Typical examples of BASOPS property includes the following:

Administration Buildings
Housing Facilities
Installation Motor Pools and Maintenance Facilities.

Reserve components (Army Reserve and Army National Guard) constitute a special category of FORSCOM which oversees training and readiness of the Guard. Examples of facilities related to the Reserve include the following:

U.S. Army Reserve Centers
National Guard Armories
Maintenance Support Facilities
Regional Maintenance Training Facilities
Weekend Training Camps

U.S. Army Reserves - (USAR-) or National Guard Bureau-Operated Installations
Army Reserve Personnel Center (ARPERCEN)

6.2.3 Training and Doctrine Command

TRADOC is responsible for the Army's schooling system, ranging from basic training for new recruits to advanced schooling for senior officers. A large portion of TRADOC's installations consist of branch schools where officers and enlisted personnel receive training in their military specialties. Typical examples of TRADOC property types, in addition to BASOPS, include the following:

Basic Training Reception Centers
Computer Simulation Centers
Miscellaneous Training Facilities
Parade Grounds
Ranges
School Halls

In addition to typical types of property, many TRADOC installations have specific structures designed to train soldiers in specific skills. These include mock-up facilities designed to simulate distinctive environments and such diverse properties as petroleum facilities or parachute training facilities.

6.2.4 Information Systems Command

The Headquarters for Strategic Communications Facilities are located at Fort Huachuca, with elements worldwide. Much of the property consists of administrative buildings. It also controls radio and communications links.

6.2.5 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) operates four laboratories that may require investigation for Cold War significance. USACE property, including in the Civil Works program, was not investigated for this study.

6.2.6 Health Services Command

This command oversees Army Medical Centers (hospitals), Fort Detrick, and the Academy of Health Sciences at Fort Sam Houston and operates medical research laboratories. The Academy of Health Sciences is comparable to TRADOC schools.

6.2.7 Military Traffic Command

This command operates three military ocean terminals: Sunny Point, (North Carolina), Bayonne (New Jersey), and Oakland, California.

6.2.8 Military District of Washington

The Military District of Washington includes Fort McNair, Fort Myer, Fort Belvoir, Fort A.P. Hill, Fort Meade, Fort Ritchie, and Arlington National Cemetery. Each of these installations has a variety of property types. Some, such as Fort Ritchie and Fort Belvoir, have properties related specifically to the Cold War.

6.2.9 Special Operations Command

Headquartered at Fort Bragg, the Special Operations Command commands Special Forces, Ranger, and other special operations units at posts throughout the United States.

6.2.10 U.S. Army Pacific

This command's geographic responsibilities include the Pacific region, except Korea, and encompasses Army installations and facilities in Alaska, Hawaii, and the U.S. possessions in the Pacific. Within Alaska and Hawaii, it principally operates garrisons for line units.

6.2.11 U.S. Army Space and Strategic Defense Command

The U.S. Army Space and Strategic Defense Command is the designated Army component of the U.S. Space Command. It is responsible for the Army portion of SDI and operates facilities at Redstone Arsenal and the Kwajalein Atoll. The Kwajalein Atoll is particularly noteworthy for its role in tracking missiles fired across the United States, and its experimental work in missile interception. It has been the launch station for missiles fired in support of the SDI. The Space and Strategic Defense Command also owns the Grand Forks ABM site, which was used for the short-lived Safeguard missile system.

6.3 PROPERTY TYPES ORGANIZED ALPHABETICALLY

The following is a list of property types in alphabetical order by heading and subheading, that may be found in the Army's inventory for the 1946 to 1989 period. It includes both property types directly associated with the Cold War, as well as those that are not directly associated.

6.3.1 Command, Control, Communications, and Computer Facilites

Antenna Ranges
Communication Terminals
Communications Vehicles
Contingency Communications Facilities
Radar Stations
Single Antennas
Teletypewriters

6.3.2 Intelligence and Surveillance Facilities

Codebreaking Facilities
Listening Stations
Radar
Satellites

6.3.3 Materiel Testing Facilites

Arctic Testing Facilities
Chemical Munitions
    Test Ranges and Grids
Conventional Weapons and Ammunition
    Calibrated Ranges
    Instrumentation
Desert Testing Facilities
Electronics
    Electronic Proving Ground
    Electronic Testing Laboratories
Environmental Chambers
Rocket and Missile Facilities

- Blockhouses
- Impact Areas
- Missile Launch Pads
- Static Test Stands
- Tracking and Telemetry Facilities

Tropic Testing Facilities
Vehicle Testing Tracks

6.3.4 Production Facilties

Aircraft Engines
Ammunition Assembly
- Artillery Ammunition
- Bombs
- Small Arms

Artillery Production
- Fire Control Mechanisms
- Gun Tubes
- Recoil Mechanisms, Carriages

Chemical and Biological Agents
Missiles and Components
Pilot Plants, Small Order Production
Production Support
Tank Production/Assembly

6.3.5 Research and Development Facilities

Accelerators
Avionics Laboratories
Biological and Chemical Laboratories
Clean Rooms
Climatic Chambers
Electronics Laboratories
Electromagnetic Pulse Simulator (Aurora)
Hot Rooms
Human Factors Laboratories
Laboratory Complexes
Night Vision Laboratories
Personnel Support Laboratories
Radiation Laboratories
Specialized Research Facilities
Supersonic Wind Tunnels
Other Research and Development Facilities

6.3.6 Storage Faciltites (Non-BASOP Related)

Depot Rebuild
Igloos
Shipping Facilities
Warehouses
    Biological
    Chemical
    Nuclear

6.3.7 Training Facilities

Computer Simulation Facilities
    Simulation for Command Post Exercises
    Simulation of Vehicles/Tanks
Mock-up Simulation Facilities
    Bridging Sites
    European Villages
    Flight Trainers/Simulators
    Maintenance Training Facilities
    Petroleum Pipelines (Small Scale)
    Port Operations
    Prisoner of War Simulation
Ranges
    Aircraft
    Artillery
    Assault Courses
    Multipurpose
    Small Arms
    Tank Gunnery
Related Training Facilities
    Adventure Training (e.g., Rappelling, Obstacles)
    Airborne Training
    Air Assault Training
    Chemical Warfare
    Tracking and Monitoring

6.3.8 Transportation Facilities

Airfields
    Control Towers
    Hangars
Military Ocean Terminals
Mobility Equipment
    Engineer Equipment
    Track Recovery Vehicles
    Trucks (Including 1/4 Ton)

6.3.9 Troop and Employee Support (BASOPS; Not Army Cold War Mililtary-Industrial Property)

- Administration Buildings
- Banking Facilities
- Chapels
- Clubs
- Commissaries/Exchanges
- Educational Facilities
  - Classroom Buildings
  - Public Schools
- Fire Stations
- Garages
- Gas Stations
- General Storage
  - Cold Storage Plants
  - Magazines
  - Storehouses
  - Warehouses
- Guard Houses
- Housing
  - Barracks
  - Dormitories
  - Hotels
  - NCO Quarters
  - Officers' Quarters
- Laundries
- Lavatories
- Libraries
- Medical Facilities
  - Clinics
  - Hospitals
  - Infirmaries
- Mess/Dining Halls
- Motor Pools and Maintenance Facilities
- Museums
- Post Offices
- Recreational Facilities
  - Bowling Alleys
  - Craft Shops
  - Field Houses
  - Gyms
  - Outdoor Facilities
    - Basketball Courts
    - Playing Fields
    - Swimming Pools
    - Tennis Courts

- Stadiums
- Theaters/Auditoriums
- Restroom Facilities/Latrines
- Sheds
  - Equipment
  - Hay
  - Lumber
  - Maintenance
- Stables
- Static Displays
- Utilities
  - Electrical Power Stations
  - Incinerators
  - Sewage Treatment Plants
  - Switch Houses
  - Telephone Exchanges
  - Water Towers/Tanks
  - Water Treatment Plants
- Visitor Centers
- Other Miscellaneous Support Facilities

6.3.10 Weapons Systems and Platforms

- Aircraft
  - Fixed Wing
  - Attack Helicopters
  - Utility Helicopters
  - Observation Helicopters
- Bombs
  - Cluster
  - Nuclear
- Missiles
  - Corporal
  - Hawk
  - Honest John
  - Jupiter (First U.S. IRBM; Developed by Army, Owned by Air Force)
  - Lacrosse
  - Nike Ajax
  - Nike Hercules
  - Pershing
  - Redstone
  - Sergeant
- Tanks, Weapons, and Fighting Vehicles
  - Antitank
    - 106mm Recoilless Rifle (vehicle mounted)
    - TOW
  - Artillery

Self Propelled
Towed
280mm Artillery
Davy Crockett Atomic Rocket
Infantry Vehicles
Armored Personnel Carriers
Bradly Fighting Vehicle
Sheridan
Tanks (M-48, M-60, M-1)

6.3.11 Other

Bomb Shelters
Memorials
Nuclear Power Plants
Special Computers

7.0 EVALUATION OF ARMY COLD WAR RESOURCES

The evaluation of a property for eligibility for listing in the National Register of Historic Places involves two steps once the property has been identified. The property will have to be assessed (1) against criteria and (2) for its integrity. The evaluation of the Army's Cold War resources will take into account Federal legislation, Army policy, and information provided in this document. This chapter provides information about legislation, policy, and guidelines, as well as the criteria necessary to evaluate the Army's Cold War resources.

7.1 FEDERAL LEGISLATION

The National Historic Preservation Act (NHPA) of 1966, as amended, establishes historic preservation as national policy and defines it as the identification, evaluation, protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering or culture. The amendments of 1980 establish guidelines for nationally significant properties, curation of artifacts, data documentation of historic properties, and preservation of Federally owned historic sites. They also (1) recognize the designation of a Federal Historic Preservation Officer in each Federal agency, (2) authorize the inclusion of historic preservation costs in project planning costs, and (3) authorize the withholding of sensitive data on historic properties when necessary. Section 106 of NHPA provides direction for Federal agencies on undertakings that affect properties listed or those eligible for listing in the National Register of Historic Places and is implemented by regulations issued by the Advisory Council on Historic Preservation. Section 110 requires Federal agencies to locate, inventory, and nominate all properties under their ownership or control that may qualify for the National Register. Applicable regulations are 36 Code of Federal Regulations (CFR) 60, National Register of Historic Places; 36 CFR 63, Determination of Eligibility for Inclusion in the National Register of Historic Places; and 36 CFR 800, Protection of Historic Properties. 36 CFR 78 waives Federal agencies responsibility to adhere to NHPA's requirements in the event of a major natural disaster or imminent threat to national security.

In essence, NHPA requires the Army to identify its significant resources, evaluate them for National Register eligibility, nominate those eligible to the National Register, and plan for the protection of the listed or eligible historic properties. The Army Cold War Military-Industrial Historic Context is designed to assist professionals in the field of cultural resources in identifying the significant Cold War military-industrial resources that may be present on Army installations. Criteria for evaluating these properties, once they are identified, are provided in section 7.3.

A detailed discussion of NHPA, its application to the Army, and guidelines for its implementation are provided in Department of the Army Regulation 200-4 and Pamphlet 200-4: *Cultural Resources Management.*

7.2 ARMY REGULATIONS

The Army's policy for managing cultural resources to comply with NHPA, while still supporting the Army mission, are prescribed in AR 200-4: *Cultural Resources Management.* Section 2-3 states,

> The installation commander shall administer, manage and treat historic properties in accordance with the NHPA. The installation commander shall also identify, evaluate, and nominate historic properties for listing in the National Register of Historic Places consistent with the policies and guidelines in this regulation and DA PAM 200-4.

DA PAM 200-4: *Cultural Resources Management* provides guidance for implementing AR 200-4. Most relevant to this Cold War study is Section 3-3. d. (2) Cold War Era Historic Properties. Section 3-3.d.(2) (b) states,

> The Criteria of Exceptional Importance is applied to properties that are less than 50 years old in order to evaluate the National Register eligibility pursuant to 36 CFR 60.4. A Cold War property may have significance under National Register criteria A-D, due to association with major historical events or persons, technological or scientific design achievement, or as a fragile survivor of a class of properties. The significance of Cold War era properties may lie at the national level in association with military themes directly tied to the Cold War, or at the state or local level under other themes.

7.3 EVALUATION CRITERIA

As stated earlier, the Army is required under NHPA and AR 200-4: *Cultural Resources Management* to evaluate the eligibility of its resources for listing in the National Register of Historic Places. The National Register provides criteria by which resources are to be assessed. The principal purpose of this U.S. Army Cold War Military-Industrial Historic Context study was to develop and provide guidance for determining the National Register eligibility of the Army's Cold War resources as they relate to this context. The National Register criteria as they relate to the guidance in this study is presented in this section.

As defined in the previous chapter, Cold War resources are those that relate directly to the Cold War itself, not just to the Cold War period (1946-1989). Because only a few of the Army's Cold War resources are more than 50 years old as of the date that this report was prepared, the vast majority of them cannot be evaluated for National Register eligibility under the Register's standard 50-year rule, which states that resources should be at least that old before they can be considered for listing. While it should be noted that some States are willing to consider slightly younger resources, in general, resources that are not 50 years old are not eligible.

Because some properties have clearly achieved local, State, or national significance before they are 50 years old, the Register does provide exceptions to the 50-year rule. *Criteria Consideration G: Properties That Have Achieved Significance in the Last Fifty Years* states that such properties must be of "exceptional importance" to qualify for listing in the Register. The

majority of the Army's Cold War properties, if being studied or subject to Section 106 of NHPA, must be evaluated under this "exceptionally important" consideration for the foreseeable future.

National Register Bulletin 15 *How to Apply the National Register Criteria for Evaluation* states that to be assessed under Consideration G, a property must (1) be less than 50 years of age, (2) continue to achieve significance into a period less than 50 years before the nomination to the Register, (3) be more than 50 years old, but have had no significance until the period less than 50 years before the nomination, or (4) be an integral part of a historic district in which the majority of the properties or the most important period of significance is less than 50 years. The Bulletin purposefully does not define "exceptional importance" except in very vague terms.

National Register Bulletin 22 *Guidelines for Evaluating and Nominating Properties That Have Achieved Significance in the Last Fifty Years* provides some additional assistance in understanding how to apply this criterion, but still does not define "exceptional importance." The purpose of this chapter is to provide cultural resources professionals with a standard, clearer, and more precise definition of "exceptional importance" so that there is less ambiguity and inconsistency nationwide in determining the Army's Cold War resources' eligibility for the National Register.

Cultural resources professionals tasked with evaluating Cold War resources for National Register significance should use this document for those properties related to the military-industrial context to determine whether the property meets the criteria for listing on the National Register as an exceptionally significant resource. Unlike the guidelines provided by the National Register, the Army is specific about what it considers eligible for listing under the less-than-50-year exception.

First and foremost, it is imperative to remember that not all resources constructed or developed during the Cold War period are considered Cold War resources. Only those resources that are directly associated with the Cold War are considered Cold War resources. Cold War properties that are not related to the military-industrial context cannot be evaluated under the context presented in this document; other contexts will need to be developed to evaluate those properties. *Only those Cold War resources that are related to the military-industrial context are the subject of this chapter.*

All other resources constructed during this period must be evaluated, as stated above, under other contexts and cannot be found exceptionally significant under the military-industrial Cold War context. The unrelated resources are currently limited to those associated with the everyday operation of the Army (listed in section 6.3.9 under Troop and Employee Support) and those properties that have recently come into the Army's ownership (such as former naval bases which became Army property during the Cold War). These resources may be eligible as significant or exceptionally significant under other contexts.

Second, Cold War "exceptionally important" sites must meet at least one of the National Register criteria by which properties are assessed under the standard 50-year rule. These criteria are briefly discussed below. Additional guidance for interpreting these criteria can be found in National Register Bulletins 15 and 22.

Criterion A: Events: According to the National Register, a property can be eligible for the National Register if it is associated with events that have made a significant contribution to the broad patterns of U.S. history. The property must be associated with one or more events important in the defined historical context. In this case, the historical context is the Army's military-industrial role in the Cold War. However, Cold War sites are not simply, by virtue of their association with the Cold War, "exceptionally significant." It is not enough that the property be associated with the Cold War---or everything built or developed between 1946 and 1989 would qualify for listing. The property must be associated with a specific Cold War event or have physical features that clearly illustrate an important Cold War theme. Furthermore, both the National Register program and the exceptional importance criteria outlined in Bulletin 22 "require that nominations for such properties demonstrate that sufficient historical perspective and scholarly, comparative analysis exist to justify the claim of the exceptional importance."

Criterion B: People: A property may be eligible if it is associated with the lives of persons significant to the past. The property must illustrate (rather than commemorate) the person's important achievements and their contribution to history, in this case, Army Cold War military-industrial history. In general, the National Register rarely accepts nominations for properties that are associated with living people.

Criterion C: Design: According to the National Register, a property may be eligible for the National Register if it embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; or possesses high artistic value. For an Army Cold War property to be considered under this criterion, the design must be directly associated with the Army and the Cold War. It is not enough that the structure may be the work of a nationally known architect (although the building may qualify for listing under criterion C under another context ♦ such as being an outstanding example of that person's work). It must be related to one of the Cold War themes. In general, this criterion will apply within the Cold War military-industrial context this criterion will apply more often to the Army's engineering feats than to its architectural achievements.

Criterion D: Potential to Yield Information: In general, this National Register criterion applies to known archeological sites that have yet to be excavated or studied. It is possible, although unlikely, that there are many Cold War sites that would be evaluated as archeological resources. Criterion D: *Potential to Yield Information*, however, could apply, in the case of the Army, to sites that remain classified for security reasons and, therefore, are difficult to identify, document, and evaluate for National Register consideration at this time. It is important to note, however, that the need for information security does not exempt installations from compliance with the AR 200-4 requirement to identify, evaluate, and nominate the significant properties that fall under this criterion.

Third, to be considered "exceptionally important," the Army Cold War military-industrial property must have national significance. Local or State significance alone does not merit consideration (as it might if only the National Register criteria were used for evaluation). This point does not disqualify a resource from being considered for National Register eligibility under the standard Register criteria when the property becomes 50 years old. Nor does it disqualify a

Cold War property of any age from being considered *under another context.* Therefore, military properties such as those found in Alaska might not be eligible for the National Register as exceptionally important, Army military-industrial, Cold War resources, but they might be eligible under the context of Alaska's post-World War II economic development.

Fourth, recent properties must be evaluated against other properties within the same Cold War theme. While rare or unique properties should receive higher priority for evaluation than recent commonplace property types, their uniqueness alone does not justify designation as an exceptionally important resource.

7.4 INTEGRITY REQUIREMENTS

If a property meets any of the National Register criteria, it must also pass the test of integrity. Properties that do not have integrity cannot be considered for inclusion in the National Register. Bulletin 15 provides a definition of the term, as well as guidance for its evaluation.

Integrity is defined as "the ability of a property to convey its significance." Evaluation of integrity is based on an understanding of the resource's physical attributes and how these relate to its significance in terms of seven qualities or aspects. The National Register identifies these as location, design, setting, materials, workmanship, feeling, and association. A property must demonstrate many, if not all, of these qualities to qualify for listing.

When assessing integrity of Cold War properties, it is important to remember that change does not automatically mean that a property has lost integrity. If constant change was required to maintain or advance technological developments to gain strategic advantage over the communist threat, the evolution of the property is important to its significance and is not considered to be a loss of integrity. If the changes are unrelated to meeting specific threats, this represents a loss of integrity and may damage the ability of a property to convey its importance.

7.5 GUIDELINES FOR APPLYING CRITERIA

Properties that meet one or more criteria, as well as the test of integrity, must then be further analyzed under one of the following relevant, organizational categories: one-of-a-kind properties, individual properties, multiple properties, or historic districts.

One-of-a-Kind Properties: These are properties whose character-defining features singularly embody a Cold War military-industrial theme or themes and that are the only known property of its type. Singularity alone does not impart exceptional importance. Cold War properties that are singular must be compared against other property types within the same theme to determine if they are truly exceptional. Although unique properties can never be accurately compared quantitatively, a qualitative comparison must take place to protect the exclusivity of the term "exceptional." The electronic pulse simulator, known as the Aurora, at the Harry Diamond Laboratories was an example of a one-of-a-kind, military-industrial, Cold War property prior to its recent disassembly. The Grand Forks ABM facility is another example of a one-of-a-kind property.

Individual Properties: Individual, military-industrial Cold War properties are those whose

physical attributes singularly represent or embody a Cold War theme. While individual properties need not be unique, they must have integrity and cannot be part of a multiple property grouping (see below).

It should be noted that many individual Cold War properties will have to be assessed in conjunction with other properties that are possibly at other installations and will not be able to be evaluated entirely on their own merits or in isolation. Because so much of the military-industrial context focuses on themes that involve many property types at several locations, it is possible that those properties that are part of a system or process will not be able to be individually assessed. For example, if one were to evaluate the properties involved in the design and development of the TOW, one would have to look at properties at more than 12 activities (section 4.2.8). Furthermore, looking at properties at only one of these installations would not provide enough information by which to evaluate the property within the context of the TOW's development. An understanding of the entire system would be needed. Individual properties that are part of systems or programs must be evaluated within the context of that entire system and not just within the context of their activity. A property at a single installation may seem important in isolation. However, without properly assessing it in the context of an entire program, it is not possible to tell whether or not it merits individual listing.

Multiple Properties: Multiple properties are the same property type, have physical characteristics that exemplify an important Cold War theme, and are extant at multiple locations. Examples would include such properties as Nike missile sites, launch pads, and test firing ranges. When multiple properties of the same property type exemplify an important Cold War theme, nomination of individual properties within the grouping will be discouraged by the Army until a study is completed that (1) fully explores the nationwide context of the property type, (2) identifies the properties nationwide that are associated with the context, and (3) evaluates their integrity. Once this study has been completed, the Army will develop a management plan for dealing with the property type that will be enforced through the use of a Memorandum of Agreement among the Department of the Army, the Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers. Such agreements have been an effective and efficient means of managing multiple resources such as World War II temporary structures. Until nationwide studies are completed, the Army will consider the properties individually should the need arise.

Historic Districts: An exceptional Cold War historic district is one composed principally of structures less than 50 years of age that are integral to understanding the unique aspects of the district's mission or association. Structures that clearly contribute to this understanding would be considered "contributing elements" to the district. Structures that only tangentially or marginally contribute would not be considered contributing members unless they qualify under the standard National Register criteria.

The following check-list summarizes the points presented in this chapter and can assist in quickly assessing whether a property is exceptionally significant under the context developed in this document.

- Is the resource less than 50 years old, or, if it is more than 50 years old, is its only period of significance less than 50 years old?
- Does the resource directly relate to the Army's military-industrial role in the Cold War?
- Does the resource have national significance?
- Does the resource meet Criterion A, B, C, or D as described above?
- Does the resource retain integrity?
- Does the property display, through physical design or association, any of the themes described in this document and does it do so in an extraordinary way?

If the answer to *all* of the above questions is "yes," then the property *may* qualify for National Register listing under the exceptional importance criterion. However, if the answer to *any* of these questions is "no," then the resource does not qualify under this consideration.

Similarly, if the answer to *any* of the questions below is "yes," then the property *does not* qualify under the Army military-industrial Cold War exceptionally significant consideration. It may qualify at a later date under the standard National Register criteria or as an exceptionally significant property under an entirely different context.

- Is the resource 50 years old or older, or was its only period of significance more than 50 years ago?
- Was the resource built or established between 1946 and 1989, but is not directly related to the Army's Cold War military-industrial themes?
- Does the resources have only local or State significance?
- Has the resource lost its integrity?
- Does the resource fail to illustrate what is important in the Army's role in the Cold War in an extraordinary way?

8.0 COLD WAR INSTALLATIONS

The following list of installations is provided to show the extent of Army holdings at two points during the Cold War, 1966 and 1989. The list was compiled from *Army Times Guide to Army Posts* published by Stackpole Books in 1966 and *The 1989-90 Green Book.*

If the source provided information about mission or tenants, that was added to the list. However, research was not conducted to verify the information. When an installation name appears in parentheses that is the 1989 name and indicates that the name had changed from how it was called in 1966. Where it is stated, "Installation not listed," that is provided solely for informational purposes. It does not necessarily mean that the installation did not exist at the time--only that it is not listed in the source. For instance, Edgewood is not listed in the 1989 *Green Book*, yet it was not a closed installation. Installations not listed in the 1966 *Guide* may or may not have been Army property at the time.

Aberdeen Proving Ground, Aberdeen, MD
Established: 1918
Mission in 1966: Aberdeen is one of the nation's major research centers and is involved in testing ordinance equipment. Research units include the Ballistics Research Laboratory (major weapon development projects for all services) and the Human Engineering Laboratory (ease of use by soldiers). The mission includes proof and development work, research in scientific and engineering fields, research and development testing, climatic testing, human factors engineering, and investigation in the field of preservatives and cleaners.
Tenants in 1989: HQ, Army Test and Evaluation Command, Chemical Research, Development and Engineering Center, Army Ordnance Center and School, Army Environmental Hygiene Agency, Ballistic Research Laboratory, Human Engineering Laboratory, Medical Research Institute of Chemical Defense, Combat Systems Test Activity, Foreign Materiel Intelligence Group, Army Materiel Systems Analysis Activity

Fort Adams, Brenton's Point, RI
Dates: 1842-1953
Mission in 1966: Inactive sub-installation of Boston Army Base
Mission in 1989: Installation not listed

Alameda Annex, Alameda, California
Dates: ? - (inactivated December 1961)
Mission in 1966: Annex to Sharpe Army Depot
Mission in 1989: Installation not listed

Aliamanu Military Reservation, Oahu, Hawaii
Mission in 1966: Ammunition Storage depot is located in the crater of an extinct volcano.
Mision in 1989: Installation not listed

Anniston Army Depot, Anniston, Alabama
Established: 1941
Mission in 1966: Army distribution depot responsible for supplying Ordnance material to seven southeastern states and five overseas areas. Receives, stores, and issues Ordnance general supply and ammunition items.
Mission in 1989: Repairs and retrofits combat tracked vehicles, artillery, missiles and small arms; receives and stores general supplies, ammunition, missiles, small arms and strategic materials
Miscellaneous: First installation to have Stradley magazines (a new type of ammunition storage structure). Pilot installation for many new systems including "marksense" editing, the depot command management system involving integrated financial and production control, and automatic data processing for control of general supplies stock.

Camp A.P. Hill (Fort A.P. Hill), 25 miles south of Fredericksburg, Virginia
Established: 1942
Mission in 1966: Provides ranges and maneuver training areas for active Army, Reserve, National Guard, and ROTC units.
Mission in 1989: Subinstallation of Ft. Meade, used for reserve components and active Army training. 76,000 acres at Bowling Green

Arlington Hall Station, Arlington, VA
Established: 1942
Mission in 1966: Under the jurisdiction of the Army Security Agency and detailed information was classified.
Mission in 1989: Not described
Tenant in 1989: Army Intelligence and Security Command

Army Building, New York City, New York
Established: ?-1961
Mission in 1966: Formerly housed First Army recruiting activities and an Armed Forces induction and examining station.

Army Chemical Center, Edgewood, MD
Mission in 1966: See Edgewood Arsenal

Armed Forces Staff College, Norfolk, VA
Established: 1946
Mission in 1966: Prepare officers from all the armed forces, as well as some U.S. civilians and officers from allied countries, for future assignments to joint and combined military commands.
Miscellaneous: Operated under the direct supervision of the Joint Chiefs of Staff, with administrative and logistic support provided by the Navy.
Mission in 1989: Facility not listed

Army Map Service, Washington, DC
Established: 1941

Mission in 1966: Under the jurisdiction of the Army Corps of Engineers, the work is primarily handled by civilian cartographers.
Mission in 1989: Facility not listed

Army Materials Technology Laboratory, 6 miles west of Boston, MA
Date Established: 1816
Mission in 1966: Installation not listed
Mission in 1989: Manages Army's structural materials and mechanics R&D program
History: Opened as Watertown Arsenal

Army Pictorial Center, Long Island City, New York
Established: 1942
Mission in 1966: The center produces, procures, processes and distributes motion pictures, film strips, recordings, and television programs on military training, orientation, education and miscellaneous subjects.
Mission in 1989: Installation not listed

Atlanta Army Depot, Forest Park, GA
Established: 1941
Mission in 1966: Storing and shipping military supplies. Maintenance of Army aircraft and general equipment. Supplies include clothing, food, medical supplies, communications and electronics equipment, and chemical supplies. Maintenance includes fixed-wing and rotary Army aircraft, engines, and crushing and screening plants.
Miscellaneous: Railway Repair shop which maintains rail equipment for Army, Air Force, and Marine Corps stations.
Mission in 1989: Installation not listed

Camp Atterbury, Columbus, Indiana
Dates: 1942-1954
Mission in 1966: Small tract retained for Reserve training.
Mission in 1989: Installation not listed

Auburn General Depot, Auburn, WA
Mission in 1966: Inactive
Mission in 1989: Installation not listed

Augusta Arsenal, Augusta, GA
Established: ?-1958
Mission in 1966: Inactive
Miscellaneous: Former general supplies depot; also worked on small arms and vehicles from Fort Gordon.
Mission in 1989: Installation not listed

Fort Baker, San Francisco, CA
Established: 1866
Mission in 1966: Sub-Post to Presidio of San Francisco

Miscellaneous: Most of Fort Baker transferred to the Treasury Department and to the GSA for disposal in 1965.
Mission in 1989: Installation not listed

Fort Banks, Winthrop, MA
Established: 1894
Mission in 1966: Scheduled to be inactivated and transferred to GSA by September 1966
Miscellaneous: Used in 1951 for use by anti-aircraft artillery units. Former "Gun and Mortar Batteries at Grover's Cliff."
Mission in 1989: Installation not listed

Camp Barkeley, Abilene, TX
Established: 1941
Mission in 1966: Inactive
Miscellaneous: Former infantry division training center, later used as armored division camp.
Mission in 1989: Installation not listed

Fort Barrancas, Pensacola, Florida
Established: 1839-?
Mission in 1966: Inactive
Mission in 1989: Installation not listed

Fort Barry, Sausalito, CA
Established: 1904
Mission in 1966: Inactive
Miscellaneous: Formerly a part of Fort Baker. Most of the post transferred to the Coast Guard and to GSA for disposal in 1965.
Mission in 1989: Installation not listed

Beaumont General Hospital, El Paso, TX
Established: 1921
Mission in 1966: Provide complete in patient and out patient care service to personnel and families of Fort Bliss, Biggs AFB, White Sands Missile Range, and other installations.
Mission in 1989: Facility not listed

Camp Beauregard, Tioga, LA
Established: 1917
Mission in 1966: National Guard and Reserve summer training
Mission in 1989: Installation not listed

Fort Belvoir, Fort Belvoir, VA
Established: 1912
Mission in 1966: Defense and Emergency missions as directed by the Military District of Washington, plus service testing programs assigned by Materiel Command. Also at Belvoir are the U.S. Army Combat Developments Command, the Army Management School (for senior officers), the Military Academy Prepatory School (which trains enlisted men from the Army and Air Force for West Point entrance tests), and the Research Support Group (men training here spend their winters at Belvoir and their summers in Greenland).
Miscellaneous: Belvoir is the Army Engineer Center. It is the site of the first "package" (air transportable and easily erected) nuclear power plant. Belvoir engineers developed a radio-controlled bulldozer for use in radioactive contaminated areas and a new mobile liquid oxygen manufacturing unit for ballistic missile use.
Tenants in 1989: Major tenants are the HQ, 29th Inf. Div. (Lt) (Army National Guard), Army Belvoir Research, Development and Engineering Center, Night Vision Laboratory, Information Systems Software Center, Defense Mapping School, Defense Systems Management College, and HQ, 310th Theater Army Area Command (USAR)

Fort Benjamin Harrison, 13 miles northeast of Indianapolis, IN
Date Established: 1903
Mission in 1966: The fort is the U.S. Army School Center/Post Headquarters. It is home to the Finance Center, Adjutant General School, Finance School, Defense Information School, Reserve components personnel Center, Enlisted Evaluation Center, and Personnel Services Support Center.
Tenants in 1989: Soldier Support Center, Finance and Accounting Center, Enlisted Records and Evaluation Center, Defense Information School, Soldier Support Institute, HQ 123rd Army Reserve Command

Fort Benning, Fort Benning, GA
Established: 1918
Mission in 1966: Fort Benning is the home of the infantry. It houses the U.S. Army Infantry school for career courses and OCS, The Infantry Center, the Infantry Board, airborne and ranger schools, helicopter company training, and a basic Army Training Center.
Tenants in 1989: Army Infantry Center and School, 197th Inf. Bde., Army School of the Americas, HQ, 75th Ranger Regiment, 36th Engr. Grp.

Biggs, Biggs, TX
Mission in 1966: Former Air Force Base to be transferred to Army. The East Coast Branch of the Defense Language Institute is scheduled to move to Biggs.
Miscellaneous: Former part of Fort Bliss
Mission in 1989: Installation not listed

Black Hills Army Depot, Igloo, SD
Established: 1942
Mission in 1966: Scheduled to be inactivated, declared excess, and transferred to GSA for disposal by June 1967.
Miscellaneous: After WWII, the depot's major work was caring for unused ammunition from overseas and disposing of surplus supplies.
Mission in 1989: Installation not listed

Camp Blanding, Starke, Florida
Mission in 1966: State-operated post for training of reservists
Mission in 1989: Installation not listed

Fort Bliss, El Paso, TX
Established: 1854? 1893?
Mission in 1966: The Primary mission of the Army Air Defense Center is training guided misslemen, artillerymen, and air defense units. Training occurs by the Army Training Center (Air Defense) and the Army Air Defense School. In addition, units ranging from small technical detachments to entire guided missile brigades engage in intensive training on the wide-spread ranges and maneuver areas.
Tenants in 1989: Army Air Defense Artillery Center and School, William Beaumont Army Medial Center, 11th Air Def. Arty. Bde., 3rd Armored Cav. Reft., Army Sergeants Major Academy

Boston Army Base, Boston, MA
Established: 1918
Mission in 1966: The base is to be closed and reported excess between January 1967 and before the end of 1969. Reserves currently use the base. Point of Embarkation Activities ended in 1946.
Mission in 1989: Installation not listed

Camp Bowie, Brownwood, TX
Mission in 1966: All but 102 acres of land disposed of in 1962. Remainder is used by the National Guard.
Mission in 1989: Installation not listed

Fort Bragg, Fort Bragg, NC
Established: 1918
Mission in 1966: Fort Bragg is the ARSTRIKE Headquarters and houses the 82nd Airborne Division. The John F. Kennedy Center for Special Warfare operates schools in both unconventional and psychological warfare for the Army and allied nations and the 77th Special Forces Group which trains airborne teams for behind-the-lines guerrilla operations are located at Fort Bragg.
Tenants in 1989: XVIII Abn. Corps, 82nd Abn. Div., 1st Corps Suppt. Command, First ROTC Region

Cameron Station, Alexandria, VA

Dates: 1942-1996
Mission in 1966: Logistical support for units and agencies in the area and transportation services for Defense Department activities. Army units include the Army Exhibit Unit, Army Information Digest, Institute of Heraldry, the Military District of Washington Commissary Office, the Military District of Washington Consolidated Exchange Office, U.S. Army aviation flight Information and NAVAIDS Office, and the USA Consolidated Household Goods Shipping Office for the Armed Forces. Cameron Station also has several Department of Defense tenants.
Mission in 1989: Provides commissary services for Washington-area military personnel
Tenants in 1989: HQ, Defense Logistics Agency, Joint Personal Property Shipping Office, Army Institute of Heraldry

Fort Campbell, Fort Campbell, KY
Established: 1942
Mission in 1966: Home of the 101st Airborne Division, 7th Transportation Battalion, 61st Medical Battalion, 2nd Howitzer Battalion, and 11th Artillery.
Tenants in 1989: 101st Abn. Div. (Air Assault)

Carlisle Barracks, Carlisle, PA
Established: 1758
Mission in 1966: Carlisle Barracks is the home of the U.S. Army War College. Its mission is to prepare selected senior officers for command- and high-level staff duties with emphasis upon Army doctrine and operations, and to advance interservice understanding.
Tenants in 1989: Army War College, Military History Institute, Strategic Studies Institute, Physical Fitness Research Institute

Fort Carson, Colorado Springs, CO
Established: 1942
Mission in 1966: Home of the 5th Infantry division (Mechanized), its main mission is infantry training.
Tenants in 1989: 4th Inf. Div. (Mech)

Fort Chaffee, Fort Smith, Arkansas
Established: 1942-1965
Mission in 1966: Fort Chaffee is inactive for regular Army purposes. It is used for training Army Reserve and National Guardsmen.
Miscellaneous: Fort Chaffee was reactivated in 1961 due to the Berlin crisis when it became an infantry training post.
Mission in 1989: Principle training site for Joint Readiness Training Center, support other active Army and reserve components training

Charles Melvin Price Support Center, Across the Mississippi River from St. Louis, MO
Established: 1942
Mission in 1966: Facility not listed
Mission in 1989: Provides administrative and logistical support to all Army elements in the St.

Louis area. Subordinate facility of Army Aviation Systems Command, St. Louis, MO

Charleston Army Depot, Charleston, SC
Established: 1916
Mission in 1966: Charleston Army Depot receives, stores, assembles, repairs, and ships transportation floating equipment.
Mission in 1989: Installation not listed

Cold Regions Research and Engineering Laboratory, NH
Established: 1961
Mission in 1966: Installation not listed
Mission in 1989: Conduct cold weather research and testing

Construction Engineering Research Laboratory, IL
Established: 1968
Mission in 1966: Laboratory not listed
Mission in 1989: Conducts research and development for Army Corps of Engineers programs in facilities construction, operation and maintenance

Corpus Christi Army Depot, 12 miles southeast of Corpus Christi, TX
Established: 1961
Mission in 1966: Installation not listed
Mission in 1989: Performs overhaul, repair, modification, retrofit and modernization of rotary wing aircraft

Davison Army Airfield, near Fort Belvoir, VA
Mission in 1966: Davison Army Airfield provides air support to the Department of the Army and is used to provide vital missions in event of floods, blizzards, and other emergencies.
Mission in 1989: Facility not listed

Defense Construction Supply Center, Columbus, OH
Established: 1918
Mission in 1966: Defense Construction Supply Center is a field installation of the Defense Supply Agency. Its mission is stock control, storage, and supply.
Mission in 1989: Installation not listed

Defense Depot, Ogden, UT
Established: 1941
Mission in 1966: Transferred to Defense Supply Agency 1 January 1964. Its mission is to receive, store, maintain, and issue common supplies to the Army, Air Force, Navy, and Marines.
Mission in 1989: Installation not listed

Fort DeRussy, Honolulu, Hawaii
Established: 1904
Mission in 1966: Army Reserve Headquarters in Hawaii
Mission in 1989: Installation not listed

Fort Detrick, Frederick, MD
Established: 1943
Mission in 1966: Investigation of biological agents and weapons, and defenses against such weapons. Also reception and relay of messages as a major facility of the U.S. Army Strategic Communications Command.
Tenants in 1989: 1110th Signal Bn., HQ, Medical Research and Development Command, and Health Services Command

Detroit Arsenal, Warren, Michigan
Established: 1941
Mission in 1966: The U.S. Army Tank Automotive Center is located at the arsenal. The Arsenal is also the location of the Headquarters, U.S. Army Mobility Command. Chrysler Corporation operates the Detroit Tank Plant on the Arsenal grounds.
Tenants in 1989: HQ, Tank-Automotive Command

Fort Devens, Fort Devens, MA
Established: 1917
Mission in 1966: Fort Devens is the home of the 196th Light Infantry brigade, the U.S. Army Security Agency Training Center and School, and the headquarters for XIII Army Corps. The post is also charged with the support of 36 Nike sites throughout New England.
Tenants in 1989: Army Intelligence School, First U.S. Army (Fwd), 10th Sp. Forces Grp. (Abn), and HQ, 187th Inf. Bde. (USAR)

Fort Dix, Fort Dix, NJ
Established: 1917
Mission in 1966: Fort Dix is primarily an infantry training center.
Tenant in 1989: Army Training Center

Fort Douglas, Salt Lake City, Utah
Established: 1862
Mission in 1966: Scheduled to be closed July 1967.
Mission in 1989: Subinstallation of Ft. Carson
Tenant in 1989: HQ, for an Army readiness group and 96th Army Reserve Cmd.

Camp Drum (Fort Drum), Watertown, NY
Established: 1908
Mission in 1966: Summer training of Reserve and National Guard troops.
Tenants in 1989: HQ, 10th Mtn. Div. (Lt Inf.)

Dugway Proving Ground, Dugway, Utah

Established: 1942
Mission in 1966: Dugway Proving Ground is a chemical, biological, and radiological testing and proving grounds. The U.S. Army Chemical, Biological and Radiological Weapons Orientation Course is also located at Dugway. Its mission is to prepare and present instructional material dealing with doctrine, techniques and capabilities in the field of chemical, biological, and radiological operations as an orientation for senior Department of Defense military and civilian personnel and personnel of other departments.
Mission in 1989: Performs test and evaluation of chemical and biological materiel, smoke and obscurants systems

Edgewood Arsenal, Edgewood, MD
Established: 1917
Mission in 1966: Edgewood Arsenal is the Army's chemical commodity center and is responsible for research and development, test and evaluation, procurement, production and mobilization planning of chemical material and related equipment.
Mission in 1989: Installation not listed

Erie Army Depot, Port Clinton, Ohio
Established: 1918
Mission in 1966: In early 1966, GSA announced it planned to sell the land and buildings of the Depot.
Miscellaneous: In 1953 the depot's supply responsibility included surface-to-air guided missiles and integrated fire control systems.
Mission in 1989: Installation not listed

Fort Ethan Allen, Essex Junction, Vermont
Established: 1892 - ?
Mission in 1966: Inactive. former cavalry and field artillery post through WWII.
Mission in 1989: Installation not listed

Fort Eustis, Newport News, VA
Established: 1918
Mission in 1966: Fort Eustis' primary mission is the training of men and units in transportation skills such as railroading, terminal service, harborcraft, and truck and aviation maintenance. It is home of the Army Transportation School, the Combat Developments Command Transportation Agency, the Transportation Engineering Agency, and the Army Aviation Material Laboratory.
Miscellaneous: Felker Army Airfield at Fort Eustis was the first military heliport designed for helicopter use.
Tenants in 1989: Army Transportation Center and School, Noncommissioned Officers Academy, Training Support Center, Aviation Applied Technology Directorate, Aviation Logistics School, 8th Trans. Bde., 7th Trans. Grp.

Fifth Army Headquarters, Chicago, Illinois
Mission in 1966: The Fifth Army Headquarters is scheduled to return to civilian status in 1967.

Miscellaneous: Prior to becoming an Army General Hospital during WW II, the building was the Chicago Beach Hotel.
Mission in 1989: Facility not listed

Fitzsimmons General Hospital (Fitzsimons Army Medical Center), Aurora, CO
Established: 1918
Mission in 1966: The hospital provides care for general medical, surgical, and specialized cases. services include neuropsychiatry, obstetrics and gynecology, pediatrics, radiology, and dental clinics.
Tenants in 1989: Fitzsimons Army Medical Center, Army Medical Equipment and Optical School, HQ, for an Army readiness group, World HQ, CHAMPUS

Fort Francis E. Warren, Cheyenne, WY.
Established: 1816
Mission in 1966: Heavy bombardment wing base
Miscellaneous Was scheduled to be closed by September 1967
Mission in 1989: Installation not listed

Frankford Arsenal, Philadelphia, PA
Established: 1816
Mission in 1966: The facility is an ordnance research and engineering center, engaged in missions dealing with fire control, instruments and guidance systems, pilot ejection catapults, armament, direct fire weapons, chronometers, and timing devices.
Mission in 1989: Installation not listed

Fort George G. Meade, 20 miles from Baltimore, MD
Established: 1917
Mission in 1966: Conglomerate of activities ranging from First Army Headquarters to support units and missile units defending Washington, DC.
Tenants in 1989: HQ, First U.S. Army, National Security Agency, HQ, 97th Army Reserve Cmd.

Fort Gillem, Southeast of Atlanta, GA
Date Established: 1941
Mission in 1966: Installation not listed
Mission in 1989: Subinstallation of Ft. McPherson
Tenants in 1989: HQ, Second U.S. Army, AAFES regional distribution ctr., HQ, U.S. Criminal Investigation Laboratory, HQ, 3rd Rgn., USA Criminal Investigation Cmd., 2nd Recruiting Bde., HQ, and 818th Hosp. Center (USAR)

Fort Gordon, Fort Gordon, GA
Established: 1942
Mission in 1966: Fort Gordon is the home to the Southeastern Signal School, Provost Marshal General's School, U.S. Army, and U.S. Civil Affairs School.
Tenants in 1989: Army Signal Center, and Dwight David Eisenhower Army Medical Center

Governors Island

See Fort Jay

Granite City Army Depot, Granite City, Illinois
Established: 1942
Mission in 1966: The Depot is a logistics facility under the command and direction of the U.S. Army Supply and Maintenance Command.
Mission in 1989: Installation not listed

Fort Greely, Fort Greely, Alaska
Established: 1942
Mission in 1966: Fort Greely is home to the U.S. Arctic Test Center, U.S. Northern Warfare Training center, and U.S. Meteological Team. From techniques devised and equipment tested at Fort Greely, the Army has learned to live and fight in intense cold and difficult terrain.
Tenants in 1989: Northern Warfare Training Center, and Army Cold Regions Test Center

Fort Hamilton, Brooklyn, NY
Established: 1825
Mission in 1966: Processing of overseas returnees from Europe for release from the Army and processing and housing of dependents coming from and going to posts overseas. Home of U.S. Chaplains School.
Mission in 1989: Provides administrative and logistical support for Army and DoD agencies in the New York metropolitan area
Tenants in 1989: HQ, New York Area Command, and HQ, 8th Medical Bde. (USAR)

Fort Hancock, Fort Hancock, NJ
Established: 1857
Mission in 1966: Sandy Hook Marine Laboratory. ARADCOM personnel stationed at Fort Hancock.
Miscellaneous: Hancock was deactivated in 1950, but was soon reactivated because of the Korean War. It was deactivated again in 1953, but again opened in 1956.
Mission in 1989: Installation not listed

Harry Diamond Laboratories, Laurel, MD
Date Established: 1953
Mission in 1966: Installation not listed
Mission in 1989: Not described
Tenant in 1989: HQ, Laboratory Command

Helemano Military Reservation, Helemano Military Reservation, Hawaii
Mission in 1966: A major relay station in the STARCOM network is located here. The post also serves as Headquarters for the U.S. army Security Agency, Pacific.
Mission in 1989: Installation not listed

Fort Holabird, Baltimore, MD
Established: 1917
Mission in 1966: Home of the U.S. Army Intelligence Center, U.S. Army Intelligence School

and the Counter Intelligence Records Facility.
Mission in 1989: Installation not listed

Fort Hood, Killeen, TX
Established: 1942
Mission in 1966: Fort Hood is the Army's armor training center. It is home of III Corps, 1st and 2nd armored divisions, and the support Brigade.
Tenants in 1989: HQ, III Corps, 2nd Armd. Div., 1st Cav. Div., 6th Cav. (Air Combat) Bde., 3rd Sig. Bde., Test and Experimentation Command, and 13th Support Command

Fort Huachuca, Sierra Vista, AZ
Established: 1882
Mission in 1966: Fort Huachuca is the Army Electronic Proving Ground, designed to test and evaluate electronic control systems and equipment.
Tenants in 1989: HQ, Army Information Systems Command, Intelligence Center and School, Army Electronic Proving Ground, Information Systems Engineering Command, 11th Sig. Bde.; Joint Test Element of Joint Tactical C^3 Agency

Hunter Army Airfield, GA
Date Established: 1941
Mission in 1966: Installation not listed
Mission in 1989: Not described
Tenants in 1989: Supports 24th Inf. Div. (Mech) and a Ranger battalion

Hunter Liggett Military Reservation (Fort Hunter Liggett), Hunter Liggett Military Reservation, California
Established: 1940
Mission in 1966: Testing center for Combat Developments Command
Mission in 1989: Subinstallation of Ft. Ord
Tenant in 1989: Test and Evaluation Command Experimentation Center

Indiana Army Ammunition Plant, Charlestown, Indiana
Established: 1941
Mission in 1966: A Class II government-owned, contractor-operated military industrial installation under the jurisdiction of the Ammunition procurement and Supply agency, a sub-command of the Munitions Command.
Mission in 1989: Installation not listed

Fort Indiantown Gap, 10 miles northwest of Lebanon, PA
Date Established: 1940
Mission in 1966: Installation not listed
Mission in 1989: Supports active Army and reserve components training

Fort Irwin, 37 miles northeast of Barstow, CA
Established: 1940
Mission in 1966: Armor and Desert Training Center. Trains tank units, familiarizes tank units with use of special armor equipment, and conducts combat firing and tactical

exercises. Army Reserve and National Guard units come to Irwin for summer training.
Tenant in 1989: National Training Center
Miscellaneous: 1940 originally called Mojave Anitaircraft Range. 29 October 1942 named Camp Irwin. Camp was deactivated in 1944. Returned to active duty in 1951. It became Fort Irwin, a permanent post, in 1961.

Irwin Army Hospital, CA
Mission in 1966: Not described
Miscellaneous: See Fort Riley

Fort Jackson, Columbia, SC
Established: June 1917
Mission in 1966: To conduct, service, support, and administer basic combat training, advanced individual training, common specialist training, and basic unit training
Mission in 1989: Conduct basic combat training and combat support advanced individual training
Tenant in 1989: HQ, 120th Army Reserve Command

Fort Jay (also known as Governors Island), near the tip of Manhattan, NY
Established: Since 1794, Governors Island has been an American military post without interruption
Mission in 1966: Not described
Miscellaneous: Became a Coast Guard base in 1966. Since 1946 it had been Headquarters, First Army. The Army departed on 31 December 1965, with Headquarters, First Army moving to Fort Meade, MD. (Second Army was deleted, with Headquarters, Second Army, at Meade consolidating with Headquarters, First Army).
Mission in 1989: Installation not listed

Jefferson Proving Ground, North of Madison, IN
Established: 1941
Mission in 1966: Proving Ground's mission between 1951-1955 was special production engineering, and research and development testing.
Miscellaneous: Testing was suspended in September 1945 and the installation became a sub-post of Indiana Arsenal in March 1946. Acceptance testing resumed in June 1949, and reactivation took place in June 1950 following the invasion of Korea. In 1958, the post was relieved of its proof testing function, which was transferred to Aberdeen Proving Ground. The proving ground was partly reactivated on 8 September 1961 due to the Berlin Crisis.
Mission in 1989: Performs testing of ammunition and components

Jeffersonville Quartermaster Depot, Jeffersonville, IN
Established: 1864
Mission in 1966: Phased out before 1966
Miscellaneous: In the late 1950s, it was known as Jeffersonville Depot Activity.
Mission in 1989: Installation not listed

Joilet Arsenal, IL
Established: 1944
Mission in 1966: Ordnance Ammunition Command is responsible for national procurement, production, industrial mobilization, stock control, and maintenance of end items of ammunition. Also responsible for manufacture, loading, assembly, and packing operations essential to ammunition production. Joilet Arsenal loads, assembles, and packs ammunition.
Miscellaneous: Formerly known as the Ordnance Ammunition Command (OAC)
Mission in 1989: Installation not listed

Judge Advocate General's School, U.S. Army, University of Virginia's campus, Charlottesville, VA
Established: 1819
Mission in 1966: Judge Advocate Officer Career Courses, and Special Courses which introduces new JAG officers to military law.
Mission in 1989: Facility not listed

Fort Kamehameha, Pearl Harbor, HI
Established: 1909
Mission in 1966: Not described
Mission in 1989: Installation not listed

Kapalama Military Reservation, Honolulu Harbor, HI
Mission in 1966: Army Transportation Terminal where MSTS ships make their stops on trans-Pacific trips.
Mission in 1989: Installation not listed

Kennedy Center for Special Warfare
See Fort Bragg

Kenner Army Hospital
See Fort Lee

Camp Kilmer, New Brunswick, NJ
Established: 1942
Mission in 1966: Training Job Corps people
Mission in 1989: Installation not listed

Kimbrough Army Hospital
See Fort Meade

King's Bay Army Terminal, Southernmost coastal region of GA
Mission in 1966: Not described
Miscellaneous: Inactive port installation
Mission in 1989: Installation not listed

Fort Knox, 35 miles south of Louisville, KY
Established: 1918
Mission in 1966: Hub of armor activity. The U.S. Army Armor School teaches tactics and training doctrine. Development and testing of armored vehicles by U.S. Armor and Engineer Board. Basic and armor branch training for EM by the U.S. Army Training Center, Armor, Human Resources Research (HUMRRO) unit also on post, as well as Army Medical Research Lab.
Tenants in 1989: Army Armor Center and School, 194th Armd. Bde., HQ, of an Army readiness group

Lawson Army Airfield
See Fort Benning

Fort Lawton, WA
Established: 1896
Mission in 1966: Provide logistical and administrative support to Army Air Defense Command units
Miscellaneous: Post scheduled to close by 1967
Mission in 1989: Installation not listed

Fort Leavenworth, Leavenworth, KS
Established: 1827
Mission in 1966: U.S. Army Command and General Staff College, the U.S. Disciplinary Barracks, and Sherman Army Airfield. The U.S. Army Command and General Staff College has the mission of officer education and study and development of tactical doctrine. Mission of the U.S. Disciplinary Barracks is to train law violators of the Army and Air Force to become useful citizens again through a program of rehabilitation. Sherman Army Airfield operates flight training facilities for rated Army personnel attending the U.S. Army Command and General Staff College, and provides transportation for the staff of the College and post.
Tenants in 1989: Combined Arms Center, the Command and General Staff College, Combined Arms Combat Developments Activity, Combined Arms training Activity, HQ, TRADOC Analysis Command, HQ, 35th Inf. Div. (Mech) of the Army National Guard, U.S. Disciplinary Barracks

Fort Lee, Petersburg, VA
Established: 1917
Mission in 1966: Army Quartermaster Center, Army Quartermaster School. Also number of separate activities, including Army Logistic Management Center
Tenants in 1989: Army Logistics Center, Army Quartermaster Center and School, Troop Support Agency

Lenape Ordnance Modification Center, Newark, DE
Mission in 1966: Army tank assembly plant
Miscellaneous: Discontinued in March 1961
Mission in 1989: Installation not listed

Fort Leonard Wood, near Rolla, MO
Date Established: 1941
Mission in 1966: Basic training center. Also engineer training.
Tenant in 1989: Engineer Center and School, Engineer Training Center

Camp Leroy Johnson, Lake Pontchartrain, New Orleans, LA
Dates: 1942-1965
Mission in 1966: From 1947-1950, the camp operated as a personnel center for handling reception, reassignment, and separation of Army personnel
Mission in 1989: Installation not listed

Fort Lesley J. McNair, Washington, DC
Established: 1791
Mission in 1966: Home of National War College, Industrial College of the Armed Forces, Inter-American Defense College, and a handful of other unites including Co. A, 1st Bn., 3d Inf. (The Old Guard)
Tenants in 1989: National Defense University, HQ, Military District of Washington

Letterkenny Army Depot, Chambersburg, PA
Established: 1941
Mission in 1966: Receives, stores, issues general supplies, conventional ammunition, guided missiles. Also calibration of Ordnance electronic test equipment
Mission in 1989: Performs storage, issue, rebuilding, testing, overhauling and demilitarization of general supplies

Letterman General Hospital, San Francisco, CA
Established: 1898
Mission in 1966: Not described
Mission in 1989: Facility not listed

Fort Lewis, 13 miles west of Tacoma, WA
Established: 1917
Mission in 1966: Support of tactical combat units and logistical support of all Army troop activities in local areas. Home of the 4th Infantry Division, one of the units

of the Strike Command.
Tenants in 1989: I Corps, 9th Inf. Div. (Mtzd), 1st Sp. Forces Grp. (Abn), 2nd Bn. Of 75th Ranger Rgmt., Fourth ROTC Region, and Madigan Army Medical Center

Lexington-Blue Grass Army Depot, 10 miles east of Lexington, KY.
Established: 1942
Mission in 1966: Maintenance, supply, and the U.S. Army Supply and Maintenance Command Logistic Data Center. Equipment stored here includes telephones, teletypewriters, radio transmitters and receivers, prefabricated huts, vehicles, trailers, ammunition, and general supplies.
Mission in 1989: Performs general supply and maintenance functions on communication security and electronics equipment, and ammunition storage

Fort Lincoln, Near Bismarck, ND
Dates: 1896- 1966
Mission in 1966: Reserve and National Guard training
Mission in 1989: Installation not listed

Camp Livingston, 10 miles north of Alexandria, LA
Mission in 1966: World War II infantry division training center
Mission in 1989: Installation not listed

Lone Star Ordnance Plant
See Red River Arsenal

Lordstown Military Reservation, Warren, OH
Established: 1942- 1965?
Mission in 1966: Storage site for plant equipment and as Ordnance supply depot
Mission in 1989: Installation not listed

Louisiana Army Ammunition Plant, 20 miles east of Shreveport, LA
Established: 1941
Mission in 1966: Not described
Mission in 1989: Installation not listed

Louisville Medical Depot, Louisville, KY
Established: Opened during World War II - 1961
Mission in 1966: Supplied medical spare parts to all military services
Mission in 1989: Installation not listed

Camp Lucas, Sault Ste. Marie, MI
Mission in 1966: Guarded the locks at St. Mary's River Falls
Mission in 1989: Installation not listed

Fort MacArthur, San Pedro, CA
Established: 1914
Mission in 1966: Variety of missions including logistical support for air defense units located throughout the area. Reserve and national Guard training in summer. The 47th Artillery Brigade (Air Defense) headquartered here. The Bridgade controls missile sites defending Los Angeles .
Mission in 1989: Installation not listed

Camp Mackall
See Fort Bragg

Madigan General Hospital, Fort Lewis reservation,WA
Mission in 1966: Medical care for active and retired military personnel and their dependents stationed in the Pacific Northwest and Alaska.
Miscellaneous: Modern surgical equipment, and a research and development laboratory. See Fort Lewis.
Mission in 1989: Facility not listed

Madison Barracks, Sacketts Harbor, NY
Established: 1815
Mission in 1966: Not described
Miscellaneous: During World War I, it was best known as a hospital post. During World War II, it was used principally in reserve capacity by both Army and Navy
Mission in 1989: Installation not listed

Marion Engineer Depot, Marion, OH
Mission in 1966: Not described
Miscellaneous: Transferred from Army control to the General Services Administration for disposition in 1961
Mission in 1989: Installation not listed

Fort Mason, San Francisco, CA
Established: 1797
Mission in 1966: A harbor artillery post in the 19th century, it gradually changed into a supply and transportation center
Miscellaneous: All Army activity at this post, except for a housing area ended in July 1966.
Mission in 1989: Installation not listed

Camp Maxey, near Paris, TX
Mission in 1966: Used as an infantry division training center
Mission in 1989: Installation not listed

Fort McClellan, Anniston, AL
Established: 1929
Mission in 1966: U.S. Army Chemical Center and School, and WAC training
Tenants in 1989: Chemical School, Military Police School, DoD Polygraph Institute, basic combat training brigade

Camp McCoy (Fort McCoy), Sparta, WI.
Established: 1909
Mission in 1966: Not described
Tenants in 1989: WI Army National Guard; Army Reserve Training Center, 4th Consolidated Training Activity

McDonald Army Hospital
See Fort Eustis

Fort McPherson, Atlanta, GA
Established: 1867
Mission in 1966: Headquarters, Third Army
Tenants in 1989: HQ, Forces Command, Third U.S. Army

Midwest Chemical Depot
See Pine Bluff Arsenal

Milan Arsenal, Milan, TN
Established: 1942
Mission in 1966: Ammunition loading plant and field service depot. Class II industrial installation
Mission in 1989: Installation not listed

Fort Miles, Lewes, DE
Mission in 1966: Fire range for conventional anti-aircraft artillery units
Miscellaneous: Inactivation was announced 17 December 1958. In 1960s was used for Reserve anti-aircraft training
Mission in 1989: Installation not listed

Military Ocean Terminal Bayonne, Bayonne, NJ
Date Established: 1939
Mission in 1966: Installation not listed
Mission in 1989: Processes and prepares cargo for water transshipment
Tenant(s): Military Traffic Management Command, Eastern Area, Military Sealift Command, Atlantic, and 27 other unnamed tenants

Military Ocean Terminal Sunny Point, Southport, NC
Established: 1955
Mission in 1966: Loading and discharging of ammunition and explosives
Mission in 1989: Loads and ships ammunition, explosives and other cargo

Miller Army Airfield, Fort Wadsworth on Staten Island, NY
Established: 1919
Mission in 1966: Not described
Mission in 1989: Installation not listed

Fort Monmouth, Monmouth County, NJ
Established: 1917
Mission in 1966: Headquarters for Army Electronics Command, Army Signal Center and School, Army Satellite Communications Agency, Army Radio Propagation Agency, and Combat Developments Command's Communications-Electronics Agency
Tenants in 1989: HQ, Army Communications-Electronics Command, Information Systems Engineering Command, Chaplain Center and School, USMA Prep School, 513th MI Bde.

Fort Monroe, Hampton, VA
Established: 1819
Mission in 1966: Headquarters Continental Army Command (USCONARC)
Tenants in 1989: HQ, Army Training and Doctrine Command, ROTC Cadet Command

Monterey
See Presidio of Monterey

Morris Army Airfield
See Atlanta General Depot

Munson Army Hospital
See Fort Leavenworth

Fort Myer, Arlington, VA
Established: 1863
Mission in 1966: Houses and provides logistical and administrative services to approximately 125 activities of Department of Defense, Department of the Army, and the Military District of Washington
Miscellaneous: Best known for the famed 1st Bn. (Reinforced), 3d Inf. (The Old Guard)
Tenants in 1989: 1st Bn., 3rd Inf. (The Old Guard), and the U.S. Army Band

Natick Laboratories (Natick Research, Development and Engineering Center), Natick, MA
Established: 1954
Mission in 1989: Responsible for research and development of aeromechanical engineering, clothing, body armor, and food and personal equipment

Navajo Army Depot, 12 miles east of Flagstaff, AZ
Established: 1962
Mission in 1966: Receives, stores, and ships ammunition, chemical toxic ammunition and GSA supplies
Mission in 1989: Installation not listed

New Cumberland Army Depot, Harrisburg, PA
Established: 1918
Mission in 1966: Storage. Also performs fourth echelon aircraft maintenance and limited depot maintenance support for installations within the First Army area, Armed Forces Entrance and Examining Center, and Air Force Recruiting Detachment
Mission in 1989: Performs direct supply support mission for eastern United States, Central America, Europe and Middle East

New Orleans Army Terminal
See Camp Leroy Johnson

Fort Niagara, near Niagara Falls, NY
Established: 1725
Mission in 1966: Not described
Mission in 1989: Installation not listed

Noble Army Hospital
See Fort McClellan

Norfolk Army Base
See Hampton Roads

Oakland Army Base, Oakland, CA
Established: 1941
Mission in 1966: Western Area headquarters of the Military Traffic Management and Terminal Service, which controls the surface movement of military freight, ocean cargo, and passengers in eight western states. Also controls cargo and passenger input to military air terminals, and operates the Military Ocean Terminal, Bay Area. A tenant unit, the U.S. Army Personnel Center, processes, houses and feeds soldiers en route to and from oversea bases.
Mission in 1989: Installation not listed

Fort Oglethorpe, 10 miles south of Chattanooga, TN, in GA
Established: 1903
Mission in 1966: Not described
Mission in 1989: Installation not listed

Fort Omaha, Omaha, NE

Established: 1868
Mission in 1966: Not described
Mission in 1989: Installation not listed

Fort Ontario, On right bank of Oswego River, NY at its junction with Lake Ontario.
Established: 1775
Mission in 1966: Not described
Mission in 1989: Installation not listed

Fort Ord, 3 miles north of Oakland, Monterey, CA
Established: 1917
Mission in 1966: Infantry Training Center. Combat Developments Command. Experimentation Command also here. Troops assigned to CDCEC train and conduct small-scale experiments at Camp Roberts and large-scale experiments at Hunter Liggett Military Reservation.
Tenant in 1989: 7th Inf. Div. (Lt)

Camp Parks, 30 miles east of Oakland, CA
Established: 1942
Mission in 1966: Job Corps training
Miscellaneous: Inactive post; transferred to GSA for disposal in 1965, with a small tract kept for Reserve training
Mission in 1989: Installation not listed

Pasadena Area Support Center, Pasadena, CA
Mission in 1966: Not described
Miscellaneous: Closed in 1965
Mission in 1989: Installation not listed

Patterson Army Hospital
See Fort Monmouth

Percy Jones Army Hospital, Battle Creek, MI
Mission in 1966: Not described
Miscellaneous: Discontinued as an Army installation on 1 June 1958
Mission in 1989: Installation not listed

Camp Perry, Port Clinton, OH
Mission in 1966: Serves as a training center for National Guard and Reserve units
Mission in 1989: Installation not listed

Philadelphia Quartermaster Center, Philadelphia, PA
Mission in 1966: Not described
Miscellaneous: By 1966 it was no longer an Army installation. Served as the Defense Supply Agency's Defense Clothing and Textile Supply Center.
Mission in 1989: Installation not listed

Picatinny Arsenal, Dover, NJ
Established: 1879
Mission in 1966: Headquarters of the U.S. Army Munitions Command. Responsible for research and engineering in the field of munitions.
Tenants in 1989: Army Armament Research, Development and Engineering Center

Camp Pickett (Fort Pickett), Blackstone, VA
Established: 1941
Mission in 1966: Summer training of Reserve and National Guard units. Pickett is responsible for training of Artillery and Armor units.
Mission in 1989: Subinstallation of Ft. Bragg supporting active Army and reserve components training

Pine Bluff Arsenal, near Pine Bluff, AR
Date Established: 1941
Mission in 1966: Installation not listed
Mission in 1989: Produces chemical munitions

Plattsburg Barracks, Plattsburg, NY
Established: 1838
Mission in 1966: Not described
Miscellaneous: Was Plattsburg Air Force Base by 1966

Plum Brook Depot, Sandusky, OH
Established: Not described
Mission in 1966: Not described
Miscellaneous: This depot was inactivated and declared surplus in 1962
Mission in 1989: Installation not listed

Pohakuloa Training Area, 38 miles west of Hilo, HI
Established: 1955
Mission in 1966: not described
Mission in 1989: Supports training of active Army, reserve components and joint/combined forces in Pacific region

Fort Polk, Vernon Parish, LA.
Established: 1941
Mission in 1966: Training Center
Tenants in 1989: 5th Inf. Div. (Mech)

Presidio of Monterey, CA
Established: 1847
Mission in 1966: Defense Language Institute, West Coast Branch
Mission in 1989: Subinstallation of Ft. Ord
Tenants in 1989: Defense Language Institute

Presidio of San Francisco, San Francisco, CA

Established: 1776
Mission in 1966: Headquarters Sixth Army. Also Sixth Region Headquarters, Army Air Defense Command; Headquarter XV Corps (Reserve); and Letterman General Hospital
Tenants in 1989: HQ, Sixth U.S. Army, Letterman Army Medical Center, Letterman Army Institute of Research

Pueblo Army Depot, 14 miles east of Pueblo, CO
Established: 1941
Mission in 1966: Receives, stores, maintains, repairs, and ships conventional ammunition, artillery, missiles, vehicles, special weapons, general supplies
Mission in 1989: Subinstallation of Tooele Army Depot. Stores and ships general supplies, maintains missile systems and bridging equipment, and demilitarizes ammunition.

Quartermaster Research & Engineering Center
See Natick Laboratories

Raritan Arsenal, Metuchen, NJ
Mission in 1966: Not described
Miscellaneous: Closed in 1961
Mission in 1989: Installation not listed

Ravenna Arsenal, Ravenna, OH
Established: Not described
Mission in 1966: Not described
Miscellaneous: Inactivated in June 1962
Mission in 1989: Installation not listed

Red River Army Depot, 17 miles from Texarkana, AR-TX
Established: 1941
Mission in 1966: Supply and maintenance of general supplies and ammunition
Mission in 1989: Stores and maintains general supplies and ammunition, maintains and overhauls combat vehicles.

Redstone Arsenal, West of Huntsville, AL
Established: 1941
Mission in 1966: The Army Missile Command is responsible for the Army rocket and guided missile programs. This covers research, design, development, production, maintenance, and supply of all Army missiles and rockets.
Tenants in 1989: HQ, Army Missile Command, Strategic Defense Command (in Huntsville), Ordnance, Missile and Munitions Center and School

Fort Richardson, 9 miles from Anchorage, AK
Established: 1940
Mission in 1966: Defense of Alaska, development of doctrine for summer and winter operations in northern areas, and operation of U.S. Army Northern

Warfare Training Center. Also support for Reserve, National guard, ROTC and Civil Defense activities, and performance of search and rescue operations.
Tenant in 1989: 6th Inf. Div. (Lt) units

Richmond Quartermaster Depot, Richmond, VA
Established: 1942
Mission in 1966: Not described
Miscellaneous: (Defense General Supply Center)
Mission in 1989: Installation not listed

Fort Riley, Junction City, KS
Established: 1853
Mission in 1966: Infantry training
Tenants in 1989: 1st Inf. Div. (Mech), HQ, and third ROTC Region

Rio Vista Army Depot Activity, Between Sacramento and Stockton, CA
Established: Not described
Mission in 1966: Not described
Miscellaneous: Inactivated 31 December 1960, it became sub-installation of Sharpe Army depot in October 1962
Mission in 1989: Installation not listed

Fort Ritchie, In MD near Blue Ridge Summit, PA
Established: 1926
Mission in 1966: U.S. Army Joint Support Command under the jurisdiction of the U.S.Army Strategic Communications Command, headquartered in Washington, DC
Tenant in 1989: HQ, 7th Signal Cmd.

Camp Roberts, San Miguel, CA
Established: During World War II
Mission in 1966: Supports limited active Army field training units of the Combat Developments Command Experimentation Command, and summer training of Army Reserve and Army National Guard units
Miscellaneous: (Fort Ord Sub-Post)
Mission in 1989: Installation not listed

Camp Joseph T. Robinson, 7 miles north of Little Rock, AR
Established: World War II post
Mission in 1966: Not described
Miscellaneous: It was activated in 1941 as an infantry division training center, and later was infantry replacement training center
Mission in 1989: Installation not listed

Rock Island Arsenal, Rock Island, IL.
Established: 1862

Mission in 1966: Headquarters, U.S. Army Weapons Command. Research and engineering on variety of weapons
Tenants in 1989: HQ, Army Armament, Munitions and Chemical Command

Rocky Mountain Arsenal, 10 miles north of Denver, CO
Established: 1942
Mission in 1966: Manufactures, renovates, stores, ships, and receives toxic and incendiary munition. Also Chemical R&D, as requested
Mission in 1989: Responsible for contamination cleanup

Fort Rodman, New Bedford, MA
Established: 1857
Mission in 1966: Not described
Miscellaneous: Scheduled for inactivation and transfer to GSA for disposal by September 1966
Mission in 1989: Installation not listed

Rossford Army Depot, Toledo, OH
Established: Not described
Mission in 1966: Not described
Miscellaneous: In 1964, the depot was declared excess and transferred to GSA.
Mission in 1989: Installation not listed

Fort Rucker, 25 miles from Dothan, AL
Established: 1942
Mission in 1966: To train officer Army aviators, and enlisted Army aircraft mechanics
Tenants in 1989: Army Aviation Center, Army Safety Center, Aviation Development Test Activity, and Army Aeromedical Center

Fort Ruger
See Fort Shafter

Sacramento Army Depot, Sacramento, CA
Established: 1942
Mission in 1966: Receives, stores, repairs, and issues Signal Corps supplies, chiefly electronics, and electrical communications equipment. Depot handles 150,000 different items, from tiny resistor to complete mobile radar set. Serves 12 states and UN Command in Far East
Mission in 1989: Repairs, rebuilds, and fabricates communication, and electronics supplies
Tenants in 1989: Communication Systems Test Activity, and Television-Audio Support Activity

St. Louis Area Support Center, St. Louis, MI
Established: Not described
Mission in 1966: Not described
Miscellaneous: Transferred to GSA in 1961
Mission in 1989: Facility not listed

Fort Sam Houston, San Antonio, TX
Established: 1879
Mission in 1966: Fort Sam Houston is the Forth Army headquarters and the home of Brooke Army Medical Center.
Tenants in 1989: HQ, Fifth U.S. Army, Health Services Command, Academy of Health Sciences, Brooke Army Medical Center, HQ, 90th Army Reserve Cmd., 5th Recruiting Bde., Midwest Commissary Region

Sandia Base, 10 miles southeast of Albuquerque, NM
Established: During World War II
Mission in 1966: Headquarters Field Command, Defense Atomic Support Agency
Mission in 1989: Installation not listed

San Jacinto Ordnance Depot, Near Houston, TX
Mission in 1966: Not described
Miscellaneous: Installation was de-activated in early 1960 with its work transferred to Red River Arsenal, near Texarkana, TX-AR
Mission in 1989: Installation not listed

Camp San Luis Obispo, San Luis Obispo, CA
Established: 1928
Mission in 1966: Not described
Mission in 1989: Installation not listed

Savanna Army Depot (Savannah Army Depot Activity), 8 miles north of Savanna, IL
Established: 1918
Mission in 1966: Receives, stores, and issues ammunition, and guided missiles. Also home of the Supply and Maintenance Command Ammunition School
Mission in 1989: Stores ammunition and general supplies
Tenants in 1989): Army Defense Ammunition Center and School, Technical Center for Explosives Safety

Schenectady Army Depot, Rotterdam, NY
Established: 1918
Mission in 1966: Not described
Mission in 1989: Installation not listed

Schofield Barracks, 25 miles from Honolulu, HI
Established: 1908
Mission in 1966: Infantry training and Headquarters, U.S. Army, Hawaii
Tenants in 1989: 25th Inf. Div. (Lt), and 45th Spt. Grp.

Schuylkill Arsenal, Philadelphia, PA
Established: 1799
Mission in 1966: Not described
Mission in 1989: Facility not listed

Seattle Army Terminal, Seattle, WA
Mission in 1966: Not described
Miscellaneous: Discontinued in 1960
Mission in 1989: Installation not listed

Seneca Army Depot, 14 miles from Geneva, NY
Established: 1941
Mission in 1966: Maintenance and supply of ammunition
Mission in 1989: Receives, stores, issues and maintains munitions and industrial plant equipment

Fort Shafter, Honolulu, HI
Established: 1899
Mission in 1966: Headquarters for U.S. Army, Pacific (USARPAC), the Army component of the joint Army-Navy-Air Force Pacific Command (PACOM). Subordinate USARPAC commands are located at Schofield Barracks in Hawaii, and in Japan, Korea, Okinawa, Taiwan, and Vietnam
Tenant in 1989: HQ, Army Western Command, and Army Support Command Hawaii

Camp Shanks, Orangeburg, NY
Established: 1943
Mission in 1966: Not described
Miscellaneous: Camp no longer existed in 1966.
Mission in 1989: Installation not listed

Sharpe Army Depot, 60 miles south of Sacramento, CA
Established: 1942
Mission in 1966: Supply and maintenance center for Army aircraft, Army tank and automotive spare parts, construction supplies and heavy equipment, air delivery equipment, electric generating equipment, and variety of other equipment
Mission in 1989: Supports western United States, Alaska and the pacific through the testing, repair, storage and shipment of military materiel

Camp Shelby, 12 miles from Hattiesburg, MS
Mission in 1966: Summer training of National Guard and Reserve troops
Mission in 1989: Installation not listed

Fort Sheridan, 25 miles north of Chicago Loop
Established: 1887
Mission in 1966: Area administrative and logistical missions extending over parts of seven states. By 1967, Headquarters, Fifth Army
Tenants in 1989: HQ, Fourth U.S. Army, Army Recruiting Command, U.S. Military Enlistment Processing Command, 425th Trans. Bde. (USAR), Army Readiness Grp., 4th Recruit, Bde. & Recruit. Bn.-Chicago

Sherman Army Airfield
See Fort Leavenworth

Sierra Army Depot, Herlong, CA
Established: 1942
Mission in 1966: Receives and stores supplies
Mission in 1989: Receives and stores strategic materiel and performs demilitarization operations

Fort Sill, Lawton, OK
Established: 1869
Mission in 1966: The Army Artillery and Missile Center, home of the Army Artillery and Missile School
Tenants in 1989: Field Artillery Center and School, and HQ, III Corps Artillery

Sioux Army Depot, 12 miles northwest of Sidney, NE
Established: 1942
Mission in 1966: Not described
Miscellaneous: Was to be inactivated, declared excess, and transferred to GSA by June 1967
Mission in 1989: Installation not listed

Fort Slocum, Near New Rochelle, NY
Mission in 1966: Not described
Miscellaneous: DoD announced in 1963 that it would close the installation.
Mission in 1989: Installation not listed

Fort Snelling, 7 miles southwest of the St. Paul, MN
Established: 1820
Mission in 1966: Not described
Miscellaneous: Decommissioned in 1947
Mission in 1989: Installation not listed

South Park Military Reservation
See Lordstown Military Reservation

Springfield Armory, Springfield, MA
Established: 1777
Mission in 1966: Not described
Miscellaneous: Was scheduled to close by April 1968
Mission in 1989: Installation not listed

Fort Myles Standish, Boston, MA
Established: 1863
Mission in 1966: During World, War II it served as the major troop staging area for the Boston POE
Miscellaneous: Inactivated 7 January 1946
Mission in 1989: Installation not listed

Fort Stevens, OR
Established: 1865
Mission in 1966: Not described
Miscellaneous: Declared surplus to Army needs on 30 June 1947
Mission in 1989: Installation not listed

Fort Stewart, 40 miles southwest of Savannah, GA
Established: 1940
Mission in 1966: Regular Army antiaircraft artillery and armor units train for range firing, tactical maneuvers, and Army Training Tests during the greater part of the year. During the summer, the post's primary mission is training Reserve troops. Tank, antiaircraft artillery, small arms ranges, and tactical training areas can all be operated simultaneously.
Tenant in 1989: 24th Inf. Div. (Mech)

Stockton Field Annex
See Sharpe Army Depot

Camp Stoneman, CA
Established: Five months after the attack on Pearl Harbor
Mission in 1966: Not described
Miscellaneous: Inactivated in December 1954
Mission in 1989: Installation not listed

Fort Story, 6 miles north of Virginia Beach, VA
Established: 1917
Mission in 1966: Boasted the heaviest armament of any Atlantic coast fort. Trained amphibious truck units, terminal service battalions, terminal service companies, and BARC platoons for service in Europe, the Far East, and the Arctic. Beaches used for Project Mobility, Triphib, Logistics-over-the-shore exercises, composite battalion training, testing of prototype vehicles, and such Army items as the rough terrain crane.
Mission in 1989: Subinstallation of Ft. Eustis, VA; amphibious and logistics-over-the-shore

training site for the active Army and reserve components

Fort Strong, Boston, MA
Established: 1898
Mission in 1966: Not described
Miscellaneous: Sub-post of Fort Banks.
Mission in 1989: Installation not listed

Sunny Point Army Terminal
See Military Ocean Terminal, Sunny Point

Susquehanna Ordnance Sub-Depot, Montgomery, PA
Mission in 1966: Not described
Miscellaneous: Inactive sub-installation of Letterkenny Army Depot.
Mission in 1989: Installation not listed

Camp Swift, 30 miles southeast of Austin, TX
Established: World War II post
Mission in 1966: Not described
Miscellaneous: Activated in 1942 as infantry division training center
Mission in 1989: Installation not listed

Fort Terry, Plum Island, 13 miles from New London, CT
Established: 1898
Mission in 1966: Not described
Miscellaneous A Coast Artillery fort, later sub-post of Fort H.G. Wright, used for National Guard training in the summer
Mission in 1989: Installation not listed

Fort Thomas, Fort Thomas, KY
Established: During World War II
Mission in 1966: Not described
Mission in 1989: Installation not listed

Fort Tilden, Queens, NY
Established: 1917
Mission in 1966: Not described
Mission in 1989: Installation not listed

Tobyhanna Army Depot, 20 miles southeast of Scranton, PA
Established: 1953
Mission in 1966: Stores, repairs, and issues all types of Army equipment. Also installs radio and navigation equipment in Army and National Guard planes
Mission in 1989: Stores general supplies, repairs and modifies communications-electronics equipment

Tooele Army Depot, Tooele City, UT

Established: 1942
Mission in 1966: Receives, stores, and issues general supply items and ammunition. Also: Maintenance of weapons, wheeled and track-laying vehicles, fire control items, missiles, ammunition and toxics, engineer, quartermaster and rail equipment. Training of Reserve and National Guard units also is depot responsibility.
Mission in 1989: Performs overhaul of tactical wheeled vehicles, field baking ovens, and water purification systems, performs DoD rail overhaul and tire retread work

Fort Totten, Queens, NY
Established: 1862
Mission in 1966: Headquarters, 1st Region, ARADCOM, Armed Forces Medical Research Laboratory, 1362d Garrison for area support
Mission in 1989: Installation not listed

Tracy Depot Activity, Tracy, CA
Established: 1942
Mission in 1966: Not described
Miscellaneous: Formerly a sub-post under Sharpe Army Depot
Mission in 1989: Installation not listed

Tripler General Hospital (Tripler Army Medical Center), Moanalua, HI
Mission in 1966: Medical Center
Mission in 1989: Performs inpatient and outpatient medical services

Two Rock Ranch Station, Petaluma, CA
Established: 1942
Mission in 1966: Not described
Miscellaneous: This station is under the jurisdiction of the Army Security Agency and detailed information about the station is classified
Mission in 1989: Installation not listed

Umatilla Army Depot, Hermiston, OR
Established: 1941
Mission in 1966: Receipt, storage, maintenance, modification, "demilitarization," inspection and shipment of munitions and related commodities
Mission in 1989: Subinstallation of Tooele Army Depot, performs care, preservation, shipping and maintenance of ammunition and other commodities

U.S. Disciplinary Barracks
See Fort Leavenworth

United States Military Academy
See West Point

Utah Army Depot

See Defense Depot, Ogden, UT

Valley Forge General Hospital, Phoenixville, PA
Established: 1942
Mission in 1966: The hospital specializes in neuropsychiatric and thoracic diseases in addition to practice of general medicine and surgery
Mission in 1989: Facility not listed

Vancouver Barracks, Vancouver, WA
Established: 1849
Mission in 1966: Not described
Mission in 1989: Installation not listed

Camp Villere
See Camp Leroy Johnson

Vint Hill Farms Station, Warrenton, VA
Established: 1942
Mission in 1966: Not described
Miscellaneous: This station is under the jurisdiction of the Army Security Agency and detailed information about the station is classified
Tenant in 1989: HQ, Army Communications-Electronics Activity

Fort Wadsworth, New York City, NY
Established: 1663
Mission in 1966: Not described
Mission in 1989: Installation not listed

Fort Wainwright, Fairbanks, AK
Established: 1961
Mission in 1966: Army units at Wainwright are charged with the ground defense of the Wainwright-Fairbanks-Eielson Air Force Base complex and the Nike-Hercules missile air defense of the same area. Research and development tests are made of clothing and equipment.
Tenants in 1989: HQ, 6th Inf. Div. (Lt), (now houses 2nd Bde., Combat Aviation Bde., 6th Engineer Bn., and division support command units)

Walson Army Hospital
See Fort Dix

Walter Reed Army Medical Center, Washington, DC

Established:	1909
Mission in 1966:	Centralized treatment, educational and research medical facility. Located here are Walter Reed General Hospital, Armed Forces Institute of Pathology, U.S. Army Institute of Dental Research, U.S. Army Biomechanical Research Laboratory, Army Region Dental Activity, Army Medical Service Historical Unit, and the Walter Reed Army Institute of Research.
Tenants in 1989:	Walter Reed Medical Center, Walter Reed Army Institute of Research, Armed Forces Institute of Pathology

Watervliet Arsenal, Gibbonsville, NY

Established:	1813
Mission in 1966:	A unit of the U.S. Army Weapons Command. Responsible for all research, design, procurement, and production control of the Army's heavy conventional weapons, including development of all Army cannon, mortars and recoilless rifles
Mission in 1989:	Conducts research, development, and production of artillery weapons.

Waterways Experimentation Station, Vicksburg, MS

Established:	1929
Mission in 1966:	Installation not listed
Mission in 1989:	Conducts research in hydraulics, soil and rock mechanics, and related technologies

Fort Wayne, Detroit, MI

Established:	1849
Mission in 1966:	Troop training center
Mission in 1989:	Installation not listed

Camp Wellfleet, South Wellfleet, MA

Mission in 1966:	Not described
Mission in 1989:	Installation not listed

West Point Military Reservation, Highland Falls, NY

Established:	1778
Mission in 1966:	"To instruct and train the Corps of Cadets so that each graduate will have the qualities and attributes essential to his progressive and continued development throughout a lifetime career as an officer of the Regular Army"
Tenant in 1989:	West Point Military Academy

White Sands Missile Range, 29 miles east of Las Cruces, NM

Established:	1945
Mission in 1966:	Testing of rocket and guided missile systems, operation of missile range
Mission in 1989:	U.S. missile and space activity and Army's main missile test site

Tenant in 1989: Atmospheric Sciences Laboratory

Wildwood Station, 160 miles southwest of Anchorage, AK
Established: 1953
Mission in 1966: Not described
Miscellaneous: Transferred from the Army to the Air Force in late 1965
Mission in 1989: Installation not listed

Fort Williams, Portland, ME
Established: 1898
Mission in 1966: Not described
Miscellaneous: Closed in 1964
Mission in 1989: Installation not listed

Fort Winfield Scott
See Presidio of San Francisco

Fort Wingate Army Depot, 10 miles east of Gallup, NM
Established: 1860
Mission in 1966: Reserve ammunition storage depot. Reserve storage of GSA supplies. Depot maintenance of ammunition. Surveillance of ammunition. Field maintenance of motorized vehicles and heavy engineer and QM equipment
Mission in 1989: Subinstallation of Tooele Army Depot; stores, ships, and renovates ammunition

Fort Wolters, Mineral Wells, TX
Established: 1941
Mission in 1966: U.S. Army Primary Helicopter School where all Army helicopter pilots receive their flight training
Mission in 1989: Facility not listed

Fort Wool, Hampton Roads, VA
Established: 1818
Mission in 1966: Not described
Miscellaneous: Was made part of Fort Monroe on 1 October 1953
Mission in 1989: Installation not listed

Fort Worden, Port Townsend, WA
Mission in 1966: Not described
Miscellaneous: Discontinued 1953
Mission in 1989: Installation not listed

Fort Worth Army Depot, Fort Worth, TX
Established: 1940
Mission in 1966: Not described
Miscellaneous: Transferred to GSA in 1966
Mission in 1989: Installation not listed

Fort H.G. Wright, Fishers Island, 6 miles southeast of New London, CT
Established: 1898
Mission in 1966: Not described
Mission in 1989: Installation not listed

Yakima Firing Center, Yakima, WA
Established: 1941
Mission in 1966: Artillery fire, large-scale maneuvers, and as a training center for Reserve and National Guard units
Mission in 1989: Subinstallation of Ft. Lewis providing ranges and maneuver areas for military units

Yuma Proving Ground, 30 miles north of Yuma, AZ
Established: 1943
Mission in 1966: Tests research and development projects
Mission in 1989: Performs desert testing for all types of materiel

NOTES

1. *American Military History* (Washington: Government Printing Office, 1989), pp. 530-532; Russell F. Weigley, *History of the United States Army* (Bloomington: Indiana University Press, 1984), pp. 599-600.

2.Ed Cray, *General of the Army: George C. Marshall, Soldier and Statesman* (New York: Simon & Schuster, 1990), pp. 618-619.

3.Lawrence S. Kaplan, *NATO and the United States: The Enduring Alliance* (Boston: Twayne Publishers, 1988) p. 15.

4.Steven L. Rearden, *The Formative Years* pp. 393-397 & passim.

5.Steven L. Rearden, *The Formative Years*, pp. 52-53.

6.Blair, *The Forgotten War*, pp. 30-35.

7.Blair, *The Forgotten War*, pp. 65-74.

8.See the 1984 study of Army Materiel Command installations completed by Building Technologies Incorporated.

9.Bacevich, *The Pentomic Era*, pp. 39-45; Edward C. Meyer, *Who Will Lead? Senior Leadership in the United States Army* (Westport: Praeger, 1995), pp. 73-81; Weigley, *History of the United States Army*, pp. 525-526.

10.Maxwell D. Taylor, *The Uncertain Trumpet* (New York: Harper & Brothers, 1960) pp. ; John M. Taylor, *General Maxwell Taylor: The Sword and the Pen* (New York: Doubleday, 1989), pp. 219-225.

11.Bacevich, *The Pentomic Era*, 81-83.

12.Bacevich, *The Pentomic Era*, 84, 95.

13.James V. Murray and John Swantek, *The Watervliet Arsenal: A Chronology of the Nation's Oldest Arsenal* (Watervliet: Watervliet Arsenal, 1993), pp. 270-271, 305-307; "Remembering Watertown Arsenal, Laboratory" deactivation program, available at the Army Research Laboratory historian's office; "The Road to ARDEC," available at the Armament Research and Development Center historian's office.

14.Murray and Swantek, *Watervliet Arsenal*, pp. 270-271.

15.Telephone conversation with Robert Burton, White Sands Proving Ground, August 7, 1996.

16.Erik Bergaust, *Rocket City U.S.A.: From Huntsville, Alabama, to the Moon* (New York: The Macmillan Company, 1963), pp. 65-69; telephone conversation with Daniel Dunn, Redstone Arsenal, August 7, 1996.

17.Bacevich, *The Pentomic Era*, pp. 87- 95; Matthew Nicols, "Ballistic Missile Defense Technology, 1945-1958," paper presented at the 1996 conference of Army historians, 19 June 1996.

18.Secretary of Defense, *Annual Report, 1952*, pp. 93.

19.Bacevich, *The Pentomic Era*, pp. 76-78

20.Donald R. Baucom, *The Origins of SDI, 1944-1983* (Lawrence: University Press of Kansas, 1992), pp. 7- 13.

21.Building Technologies Incorporated, *Historic Properties Report: Tarheel Army Missile Plant* (Silver Spring, MD: Building Technologies Inc., 1984), pp.

22.Owen Wilkes, et al. *Chasing Gravity's Rainbow: Kwajalein and U.S. Ballistic Missile Testing* (Canberra, Australia: Nautilus Pacific Research, 1991), pp. 55-59.

23.Weinert, *History of Army Aviation*, pp. 77- 101, pp. 225-227; Val L. McGee, *The Origins of Fort Rucker* (Ozark, AL: Dale County Historical Society, 1987), pp. 167-176.

24.David W. Hogan, *Raiders or Elite Infantry? The Changing Role of the U.S. Army Rangers from Dieppe to Grenada* (Westport: Greenwood Press, 1992), pp. 129-133 & passim.

25.Hogan, *Raiders or Elite Infantry?*, pp. 139-143.

26.Hogan, *Raiders or Elite Infantry?*, pp. 157- 159; phone conversation with David Hogan September 11, 1996.

27.Crossland and Currie, pp. 100-123.

28.Secretary of Defense, *Annual Report 1955*, pp. 112-113.

29. Robert Harris and Jeremy Paxman, *A Higher Form of Killing: The Secret Story of Gas and Germ Warfare* (London: Chatto & Windus, 1982), pp. 142-148.

30.Rebecca R. Raines, *Getting the Message Through: A Branch History of the U.S. Army Signal Corps* (Washington: Government Printing Office, 1996), p. 318.

31.Raines, *Getting the Message Through*, pp. 334-338.

32.Raines, *Getting the Message Through*, pp. 330-333.

33.John P. Finnegan, *The Military Intelligence Story: A Photo History* (Fort Belvoir: U.S. Army Intelligence and Security Command, 1994). pp. 19-21; James L. Gilbert, *Military Intelligence: A*

Fact Book, (Fort Belvoir: U.S. Army Intelligence and Security Command, 1995), passim.

34.Bacevich, *The Pentomic Era*, p. 45.

35.Russell F. Weigley, *History of the United States Army*,539; Richard L. Kugler, *Commitment to Purpose: How Alliance Partnership Won the Cold War* (Santa Monica: Rand Corporation, 1993), pp. 169-189.

36.Other histories of NATO include William Park, *Defending the West: A History of NATO* (Boulder: Westview Press, 1986); and Lawrence S. Kaplan ed., *NATO After Forty Years* (Wilmington: Scholarly Resources, 1990).

37.Dino A. Brugioni, *Eyeball to Eyeball: The Inside Story of the Cuban Missile Crisis* (New York: Random House, 1990).

38.Among the many studies of American involvement in Vietnam, the one most influential in the writing of this report is Stanley Karnow, *Vietnam: A History* (New York: Viking Press, 1983).

39.George Q. Flynn, *The Draft, 1940-1973* (Lawrence: University Press of Kansas, 1993), pp. 249-258; Bettie J. Morden, *The Women's Army Corps, 1945-1978* (Washington: Government Printing Office, 1990), pp. 395-397.

40.Edward C. Meyer, *Who Will Lead? Senior Leadership in the United States Army*, p. 135.

41.*Department of the Army Historical Summary* 1969, p. 11; Vernon Pizer, *The United States Army* (New York: Praeger, 1967), pp. 134-135.

42.Secretary of Defense, *Annual Report*, 1964, p. 112; *DA Historical Summary*, 1969, p. 11.

43.*DA Historical Summary*, 1971, p. 6-7.

44.Pizer, *The United States Army*, pp. 129-130.

45.These command titles are accurate as of 1967. Pizer, *The United States Army*, pp. 68-69.

46."A History of the Centralized Military Traffic Management Concept," mss, office of the MTMC historian.

47.John P. Finnegan, *The Military Intelligence Story*: A Photo History (Fort Belvoir: U.S. Army Intelligence and Security Command, 1994), pp. 20-21; James Gilbert, *Military Intelligence: A Fact Book* (Fort Belvoir: Intelligence and Security Command, 1995), pp. 26-27.

48.Donald R. Baucom, *The Origins of SDI, 1944-1983, pp.*34-38.

49.Baucom, *The Origins of SDI*, pp. 39-50.

50.Edward Reiss, *The Strategic Defense Initiative* (Cambridge: Cambridge University Press, 1992), pp. 32-33; Robert D. Hammond and Henry G. Franke, "The Army's Role in the Strategic

Defense Initiative and Antisatellite Programs" in Robert L. Phaltzgraff and Richard H. Shults, eds., *The United States Army: Challenges and Missions for the 1990s* (Lexington: D.C. Heath and Company, 1991), p. 101.

51.Under the initial reorganization, the services still retained responsibility for their own supply depots. The transfer of all supply depots to the Defense Logistics Agency did not occur until the late 1980s.

52.See the Building Technology Incorporated studies of AMC installations for more details.

53.Army Times, *Guide to Army Posts* (Harrisburg: Stackpole Books, 1966), passim.

54.*APG News Supplement*, July 31, 1985. (Available in the TECOM historian's office)

55.AMC Historical Office, *Arsenal for the Brave*, p. 27.

56.Mary T. Cagle, *History of the Missile System* (Redstone Arsenal: Headquarters MICOM, 1977).

57.Norman M. Covert, *Cutting Edge: A History of Fort Detrick, Maryland, 1943-1993* (Frederick, MD: U.S. Army Garrison, Ft. Detrick, 1993), pp. 51-53; Edward M. Spiers, *Chemical Warfare* (Urbana: University of Illinois Press, 1986), pp. 142-143; Walter J. Stoessel, et al., *Report of the Chemical Warfare Commission* (Washington: United States Chemical Warfare Review Commission, 1985), pp. 19-22; Amoretta M. Hoeber, *The Chemistry of Defeat: Asymmetries in U.S. and Soviet Chemical Warfare Postures* (Cambridge, MA: Institute for Foreign Policy Analysis, 1981); Hugh Stringer, *Deterring Chemical Warfare: U.S. Policy Options for the 1990s* (Cambridge, MA: Institute for Foreign Policy Analysis, 1986), p. 30.

58.Edward C. Meyer, *Who Will Lead? Senior Leadership in the United States Army*, p. 135, 147, & passim; Richard L. Kugler, *Commitment to Purpose: How Alliance Partnership Won the Cold War*, p. 191.

59.Meyer, *Who Will Lead?*, pp. 145-146; Lewis Sorley, *Thunderbolt: General Creighton Abrams and the Army of His Times* (New York: Simon & Schuster, 1992), pp. 350-378.

60.Maurice A. Mallin, *Tanks, Fighters & Ships: U.S. Conventional Force Planning Since WWII* (Washington: Brassey's (U.S.) Inc., 1990), pp. 196-198; Kugler, *Commitment to Purpose*, pp. 270-272.

61.Hugh Stringer, *Deterring Chemical Warfare: U.S. Policy Options for the 1990s* (Cambridge, Massachusetts: Institute for Foreign Policy Analysis, 1986), p. 30; Edward M. Spiers, *Chemical Warfare*.

62.Kugler, *Commitment to Purpose*, pp. 308-325 & passim; Edward C. Meyer, *E. C. Meyer, General, United States Army, Chief of Staff* (Privately published, n.d.), pp. 98-99, 146-147.

63.John L. Romjue, Susan Canedy & Anne W. Chapman, *Prepare the Army for War: A*

Historical Overview of the Army Training and Doctrine Command (Fort Monroe: Training & Doctrine Command, 1993), pp. 21-40.

64.Romjue, Canedy & Chapman, *Prepare the Army for War*, 32-33 & passim.

65.Anne W. Chapman, *The Origins and Development of the National Training Center, 1976-1984* (Fort Monroe: Training and Doctrine Command, 1992).

66.John L. Romjue, *The Army of Excellence: The Development of the 1980s Army* (Fort Monroe: Training and Doctrine Command, 1993).

67.John L. Romjue, From *Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-1982* (Fort Monroe: Training and Doctrine Command, 1984); Russell F. Weigley, *History of the United States Army*, pp. 581-583.

68.Romjue, Canedy, & Chapman, *Prepare the Army for War*, pp. 42-43 & passim.

69.AMC Historical Office, *Army Materiel Command Evolution, 1962-1993* (Alexandria, VA: Army Materiel Command, 1993).

70.Department of the Army, *1984 Weapon Systems* (Washington: Department of the Army, 1984).

71.This discussion of the M-1 is derived largely from Orr Kelley, *King of the Killing Zone* (New York: W.W. Norton & Company, 1989).

72. Rebecca R. Raines, *Getting the Message Through: A Branch History of the U.S. Army Signal Corps*, pp. 398-400.

73.Raines, *Getting the Message Through*, pp. 393-398.

74.Edward Reiss, *The Strategic Defense Initiative* (Cambridge: Cambridge University Press, 1992), p. 37.

75.Reiss, *Strategic Defense Initiative*, pp. 58-59.

76.For example see Owen Wilkes et. al. *Chasing Gravity's Rainbow: Kwajalein and US Ballistic Missile Testing*, passim; Reiss, *Strategic Defense Initiative*, passim; Donald R. Baucom, *The Origins of SDI, 1944-1983*, pp. 197-200; David Wirls, *Buildup: The Politics of Defense in the Reagan Era* (Ithaca: Cornell University Press, 1992), pp. 133-137.

77.Reiss, *Strategic Defense Initiative*, pp. 61-63.

78.Wilkes et al, *Chasing Gravity's Rainbow*, pp. 99-115.

79.Mark Adkin, *Urgent Fury: The Battle for Grenada* (Lexington: D.C. Heath and Company, 1989); Mallin, *Tanks, Fighters & Ships*, pp. 220-227.

80.Office of Technology Assessment, *The Defense Technology Base: Introduction and Overview* (Washington: Office of Technology Assessment, 1988), pp. 85-86

81.Office of Technology Assessment, *Defense Technology Base*, pp. 77-78.

82.Murray and Swantek, *Watervliet Arsenal: A Chronology of the Nation's Oldest Arsenal* (Watervliet Arsenal, pp. 367, 411. The laboratory was named after the former Chief of Ordnance Stephen Vincent Benet.

83.Office of Technology Assessment, *Defense Technology Base*, pp. 86-87.

84.*APG News Supplement*, July 31, 1985.

85.Telephone conversation with Robert Burton, White Sands Proving Ground, August 7, 1996, White Sands Missile Range files, office of the MICOM historian, Redstone Arsenal.

86.Steve Gaither, *Looking Between Trinity and the Wall: Army Materiel Command Cold War Material Culture Within the Continental United States, 1945-1989* (Draft) (Prepared under contract for the Fort Worth District, U.S. Army Corps of Engineers by GeoMarine Inc, Plano Texas, 1996), 85-87.

87.Telephone conversation with James Gregory, Fort Belvoir June 26, 1996; telephone conversation with Carol Anderson, Fort Lee, June 12, 1996.

88.Gaither, *Looking Between Trinity and the Wall*, p. 73.

89. Telephone conversation with Libby Fowler, Pine Bluff,

90.Murray and Swantek, *Watervliet Arsenal*, passim.

91.Building Technologies Inc., *Detroit Arsenal*, pp. 33-38.

92.Building Technologies Inc., *Lima Army Tank Plant*, pp.19-22.

93.Building Technologies Inc, *Tarheel Army Missile Plant*, pp. 17-22; Building Technologies Inc., *Stratford Army Engine Plant*, passim.

94.Stephen P. Moeller, "Vigilant and Invincible." *ADA Magazine* May-June 1995. [The article also appears on the Redstone Arsenal home page of the world wide web.]

95.Matthew Nichols, "Ballistic Missile Defense Technology, 1945-1958," paper presented at the 1996 Conference of Army Historians, 19 June 1996.

96.Roger Hatheway, *Historical Cultural Resources Survey and Evaluation of the Nike Missile Sites in the Angeles National Forest* (San Diego: WESTEC Services Inc., 1987); Mark Morgan, "Nike Quick Look III," (MSS Office of the Air Defense Artillery Center historian, 1990).

97.Donald R. Baucom, The Origins of SDI, 1944-1983, pp.

98.Telephone conversation with Danny Dunn, Redstone Arsenal, August 6, 1996; Michael E. Baker and Kaylene Hughes, *Redstone Arsenal Complex Chronology* (Redstone Arsenal: U.S. Army Missile Command, 1993); Michael E. Baker, *Redstone Arsenal, Yesterday and Today* (Redstone Arsenal: U.S. Army Missile Command, 1995).

99.Owen Wilkes, et al., Chasing Gravity's Rainbow: Kwajalein and US Ballistic Missile Testing.

100.Building Technologies Inc., *White Sands Missile Range and Utah Launch Complex* (Silver Spring, MD: Building Technologies Inc., 1984); White Sands Missile Range files, office of the MICOM historian, Redstone Arsenal.

101.Telephone conversation with Robert Burton, White Sands Missile Range, August 7, 1996.

102.Bruno J. Rolak, *History of the United States Army Communications Command, 1964-1976* (Fort Huachuca: Army Communications Command, 1976); Raines, *Getting the Message Through: A Branch,* pp. 345-349.

103.Raines, *Getting the Message* Through, pp. 398-400.

104.James L. Gilbert, *Military Intelligence: A Fact Book* (Fort Belvoir: U.S. Army Intelligence and Security Command, 1995), pp. 23-32.

105.The Army War College or the Army Logistics Management College did not become a part of TRADOC until after the Cold War.

106.Anne W. Chapman, *The Origins and development of the National Training Center, 1976-1984* (Fort Monroe: Training & Doctrine Command, 1992).

107.Lawrence H. Suid, *The Army's Nuclear Power Program* (Westport: Greenwood Press, 1990).

APPENDIX A: ACRONYMS

ABM	antiballistic missile
ACAN	Army Command and Administrative Network
AEC	Atomic Energy Commission
AMC	Army Materiel Command
AMCCOM	Armament, Munitions, and Chemical Command
ARL	Army Research Laboratory
ARPERCEN	Army Reserve Personnel Center
ASA	Army Security Agency
ASDC	Army Strategic Defense Command
BASOPS	Base Operations
CENTCOM	United States Central Command
CFR	Code of Federal Regulations
CIA	Central Intelligence Agency
CONARC	Continental Army Command
CONUS	continental United States
DARCOM	Development and Readiness Command
DESCOM	Depot Systems Command
DEW	Distant Early Warning
DLA	Defense Logistics Agency
DSA	Defense Supply Agency
EUCOM	United States European Command
FORSCOM	Forces Command
GOCO	Government-Owned Contractor-Operated
ICBM	Intercontinental Ballistic Missiles
IRBM	Intermediate Range Ballistic Missile
LABCOM	Laboratory Command
LOTS	logistics over the shore
MAD	mutual assured destruction
MICOM	Missile Command
MILES	Multiple Integrated Laser Engagement System
MLRS	multiple launch rocket systems
MOUT	Military Operations in Urban Terrain
MTMC	Military Traffic Management Command
MTMTS	Military Traffic Management and Terminal Service
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NCO	Noncommissioned Officers
NHPA	National Historic Preservation Act
NVA	North Vietnamese Army
OPFOR	opposing forces
OSS	Office of Strategic Services
RDE	Research, Development, and Engineering
RDJTF	Rapid Deployment Joint Task Force
ROAD	Reorganization Objective Army Division
ROTC	Reserve Officers' Training Corps

SDI	Strategic Defense Initiative
SLMB	Submarine Launched Ballistic Missiles
SMC	Supply and Maintenance Command
STRAC	Strategic Army Corps
TECOM	Testing and Evaluation Command
TOW	tube launched, optically tracked, wire guided
TRADOC	Training and Doctrine Command
U.N.	United Nations
USACE	U.S. Army Corps of Engineers
USAR	U.S. Army Reserves
USAREUR	United States Army Europe

APPENDIX B: BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY BIBLIOGRAPHY

Adkin, Mark. *Urgent Fury: The Battle for Grenada*. Lexington: D.C. Heath and Company, 1989. Provides background on the problems of coordination during this operation.

Akens, David S. *Historical Origins of the George C. Marshall Space Flight Center*. Huntsville: National Aeronautics and Space Administration, 1960. Relates the story of Redstone Arsenal's pioneering efforts in space exploration and the transfer of functions to NASA.

Army Materiel Command, Historical Office. *Arsenal For the Brave: A History of the United States Army Materiel Command, 1962-1968*. Alexandria: Army Materiel Command, 1968. A history of the formative years of AMC.

Army Research Laboratory. *The Genealogy of ARL*. Adelphi: Army Research Laboratory, 1993. A short background piece about AMC laboratories during the Cold War era.

Bacevich, A. J. *The Pentomic Era: The U.S. Army between Korea and Vietnam*. Washington, D.C: National Defense University Press, 1986. The standard overview history of the Army during the 1950s; excellent overview of Army development in the context of national security policy.

Baker, Michael E. *Redstone Arsenal: Yesterday and Today*. Redstone Arsenal: Historical Division, U.S. Army Missile Command, 1995. A short public relations brochure.

Baker, Michael E. And Kaylene Hughes. *Redstone Arsenal Complex Chronology*. Redstone Arsenal: Historical Division, U.S. Army Missile Command, 1993. A chronological overview of the arsenal and its achievements.

Baucom, Donald R. *The Origins of SDI, 1944-1983*. Lawrence: University Press of Kansas, 1992. A scholarly history of the American ballistic missile defense programs.

Bergaust, Erik. *Rocket City U.S.A.: From Huntsville Alabama to the Moon*. New York: The Macmillan Company, 1963. A popular history of Redstone Arsenal and the Marshall Space Center.

Blair, Clay. *The Forgotten War: America in Korea, 1950-1953*. New York: Doubleday, 1987. A fast-moving account of combat in Korea.

Boettcher, Thomas D. *First Call: The Making of the modern U.S. Military, 1945-1953*. Boston: Little Brown & Company, 1992. Describes U.S. Army immediately after WWII.

Boyne, Walter J. and Daniel S. Lopez. *Vertical Flight*. Washington, D.C: Smithsonian Institution Press, 1984. An illustrated history of helicopters.

Cagle, Mary T. *History of the TOW Missile System*. Redstone Arsenal: U.S. Army Missile Readiness Command, 1977. A declassified study of the technical development of this weapon.

Chapman, Anne W. *The Origins and Development of the National Training Center, 1976-1984*. Ft. Monroe: Training & Doctrine Command, 1992. Relates how the requirement to train units in open maneuvers resulted in the creation of the National Training Center.

Collins, J. Lawton. *Lightning Joe: An Autobiography*. Baton Rouge: Louisiana State University Press, 1979. Although most of the focus is upon Collins' WWII years, he discusses his years as Chief of Staff.

Covert, Norman M. *Cutting Edge: A History of Fort Detrick, Maryland, 1943-1993*. Frederick, MD: U.S. Army Garrison, Ft. Detrick, 1993. A short, but useful history of Fort Detrick, from its years as a biological warfare research center to its present role as a Medical Command installation.

Cray, Ed. *General of the Army: George C. Marshall, Soldier and Statesman*. New York: Simon & Schuster, 1990. A one volume biography of the general, includes a discussion of his service during the Cold War as Secretary of Defense and Secretary of State.

Crossland, Richard B. and James T. Currie. *Twice the Citizen: A History of the United States Army Reserve, 1908-1983*. Washington, D.C: Office of the Chief of the Army Reserve, 1984. A history of the Army Reserve, discusses national policy decisions.

Crow, Duncan. *Modern Battle Tanks*. New York: Arco Publishing Company, Inc., 1978. Provides technical information about tanks throughout the world, has a chapter on the M-48/M60 tanks.

Department of the Army. *A Guide to Army Philosophy*. Washington, D.C: U.S. Army, 1958. A DA Pamphlet emphasizing the need for conventional forces.

_____. *Cultural Resources Management*, DA Pamphlet 200-4,. This Pamphlet provides detailed information to installation cultural resource managers.

_____. *Cultural Resources Management*, AR 200-4. This regulation sets forth Department of the Army policy regarding cultural resource management. It supersedes AR 420-40.

_____. *Historical Summary*. 1968 to present. Designed as a replacement for the Annual Reports. Provides a synopsis of historical highlights for each command.

_____. *1984 Weapons Systems*. Washington, D.C: Department of the Army, 1984. An illustrated description of the important weapons systems as of 1984.

_____. *Report on the Reorganization of the Department of the Army*. Washington, D.C: Department of the Army, 1961. Describes the planned abolition of the technical services and creation of Army Materiel Command.

_____. *American Military History*. Washington, D.C: Government Printing Office, 1989. Originally prepared as an ROTC textbook, is a standard overview of military history, emphasizing operations.

Department of Defense. *Annual Reports*. 1947-1967. A record of the historical highlights of each service, has a section prepared by the Army.

Department of the Interior. National Park Service. *National Register Bulletin #15, How to Apply National Register Criteria for Evaluation*. Washington, D.C: Government Printing Office, [1983]. The standard reference for evaluating potential historic resources, explain National Register standards.

_____. *National Register Bulletin #22: Guidelines for Evaluating and Nominating Properties that Have Achieved Significance Within the Last Fifty Years*. Washington: Government Printing Office, [n.d.]. Clarifies guidelines for defining exceptional significance and evaluating property that does not meet the 50-year criteria.

Epley, William W. *America's First Cold War Army, 1945-1950*. Arlington: Association of the United States Army, 1993. This brief study emphasizes the training and personnel problems faced by the American Army during the demobilization following WWII.

Faulk, Odie B. and Laura E. Faulk. *Fort Hood: The First Fifty Years*. Temple: The Frank W. Mayborn Foundation, 1990. A history of the post, written for personnel associated with Ft. Hood.

Finnegan, John P. *The Military Intelligence Story: A Photo History*. Fort Belvoir: U.S. Army Intelligence and Security Command, 1994. An illustrated history of military intelligence activities, provides background on various Army organizations associated with this function.

Flynn, George Q. *The Draft, 1940-1973*. Lawrence: University of Kansas, 1986. A scholarly history of the Selective Service system and its demise.

Gaither, Steve. *Looking Between Trinity and the Wall: Army Materiel Command Cold War Material Culture Within the Continental United States* (Draft). Plano, Texas: Geo-Marine Inc., 1996. An in-progress study of the historic context of the Army Materiel Command during the Cold War era.

Gelb, Norman. *The Berlin Wall*. London: Michael Joseph, 1986. Tells how the Berlin crisis eventually resulted in the division of the city.

Grathwol, Robert P. And Donita M. Moorhus. *American Forces in Berlin: Cold War Outpost, 1945-1994*. Washington, D.C: Government Printing Office, 1994. An illustrated history of the U.S. Army and the protection of West Berlin.

Green, Constance M. and Milton Lomask, *Vanguard: A History*. Washington, D.C: National Aeronautics and Space Administration, 1970. Describes the first efforts to launch a satellite, with a discussion of the Army successful explorer launch.

Hammond Robert D. and Henry G. Franke, "The Army's Role in the Strategic Defense Initiative and Antisatellite Programs" in Robert L. Phaltzgraff and Richard H. Shults, eds., *The United States Army: Challenges and Missions for the 1990s*. Lexington: D.C. Heath and Company, 1991. Describes the Army's role in SDI to that time and future plans.

Hatheway, Roger. *Historical Cultural Resource Survey and Evaluation of the Nike Missile Sites in the Angeles National Forest, Los Angeles County, California*. San Diego: WESTEC Services, Inc, 1987. A CRM study that describes the layout of a Nike Missile site.

Harris, Robert and Jeremy Paxman. *A Higher Form of Killing: The Secret Story of Gas and Germ Warfare*. London: Chatto & Windus, 1982. The most complete history of chemical warfare, highly biased and selective in presentation of facts.

Hewes, James E. *From Root to McNamara: Army Organization and Administration, 1900-1963*. Washington, D.C: Government Printing Office, 1975. The standard history of Army bureaucratic structure, essential to understanding how the Army functioned.

Historical Highlights: U.S. Army Munitions Command & Frankford Arsenal. Philadelphia: Frankford Arsenal, [1971]. A short mimeographed history of Frankford Arsenal, provided by the ARTEC historian.

"A History of the Centralized Military Traffic Management Concept". MSS Office of the MTMC Historian. A short manuscript history that describes the evolution of transportation management to the eventual formation of MTMC.

Hoeber, Amoretta M. *The Chemistry of Defeat: Asymmetries in U.S. and Soviet Chemical Warfare Postures*. Cambridge, MA: Institute for Foreign Policy Analysis, 1981. Emphasizes Soviet superiority in chemical warfare and calls for increased American efforts.

Hogan, David W. *Raider or Elite Infantry? The Changing Role of U.S. Army Rangers from Dieppe to Grenada*. Westport: Greenwood Press, 1992. A history of Army Rangers, emphasizing the WWII years, but includes a discussion of Cold War and a brief description of Special Forces.

Holm, Jeanne M. "Women in the United States Military, 1945-1958." Paper delivered at the Conference of Army Historians, June 18, 1996. A retired Air Force major general and expert on the subject describes the early years of women in a peacetime military.

Huston, James A. *Outposts and Allies: U.S. Army Logistics in the Cold War, 1945-1953.* Selinsgrove: Susquehanna University Press, 1988. Emphasizes foreign aid, stationing of forces abroad, and disposition of WWII surplus in foreign nations.

Kelley, Orr. *King of the Killing Zone.* New York: W.W. Norton & Company, 1989. A history of the development of the M-1 tank, describes the materiel procurement process and the decisions involved in the design of the tank.

Kaplan, Lawrence S. *NATO and the United States: The Enduring Alliance.* Boston: Twayne Publishers, 1988. A diplomatic history of NATO.

_____. *NATO After Forty Years.* Wilmington: Scholarly Resources, 1990. A diplomatic history of NATO

Karnow, Stanley. *Vietnam: A History.* New York: Viking Press, 1983. One of the better histories of the Vietnam conflict.

Kelley, Francis J. *U.S. Army Special Forces, 1961-1971.* Washington, D.C: Government Printing Office, 1973. Part of the "Vietnam Studies" series by CMH, a contemporary history of Special Forces in Vietnam.

Koropey, O.B. *It Seemed Like a Great Idea at the Time: The Story of the Sergeant York Air Defense Gun.* Alexandria, VA: Army Materiel Command, 1993. Describes the origin and demise of the Sergeant York system, with an emphasis upon the public relations mistakes.

Krasniewicz, Louise. *Nuclear Summer: The Clash of Communities at the Seneca Women's Peace Encampment.* Ithaca: Cornell University Press, 1992. An anthropologists study of the women's peace encampment near an alleged nuclear munitions storage site.

Kugler, Richard L. *Commitment to Purpose: How alliance Partnership Won the Cold War.* Santa Monica: Rand Corporation, 1993. Solid discussion of both military and diplomatic aspects of NATO, discusses force disposition in central Europe.

Lewis, Richard S. *Appointment on the Moon: The Inside Story of America's Space Venture.* New York: The Viking Press, 1968. A popular history of the early space program.

Mallin, Maurice A. *Tanks, Fighters & Ships: U.S. Conventional Force Planning Since WWII.* Washington: Brassey's (U.S.) Inc., 1990. A discussion of conventional weapons for all services, emphasis relations between policy and weapons systems.

Markusen, Ann, et al. *The Rise of the Gunbelt: The Military Remapping of Industrial America.* New York: Oxford University Press, 1991. A history of the "military industrial complex".

McGee, Val L. *The Origins of Fort Rucker*. Ozark, Alabama: Dale County Historical Society, 1987. A popular history of the post.

McNaugher, Thomas L. *The M-16 Controversy: Military Organizations and Weapons Acquisition*. New York: Praeger, 1984. Describes the technical and policy issues surrounding the design of the Army assault rifle.

Meyer, Edward C. *E. C. Meyer, General, United States Army, Chief of Staff*. Privately Published, [n.d.] A collection of the former Chief of Staff's speeches.

_____. Who Will Lead? Senior Leadership in the United States Army. Westport: Praeger, 1995. A combination of memoirs and collective biography of the men who became four star generals, especially good for the post Vietnam years.

Moeller, Stephen P. "Vigilant and Invincible." *ADA Magazine*. May June 1995. A superb history of the creation of air defense commands, is also available through the Redstone Arsenal homepage on the internet.

Moenk, Jean R. *A History of Command and Control of Army Forces in the Continental United States, 1919-1972*. Fort Monroe: Historical Office, Continental Army Command, 1972. An overview of the Army command structure within the United States.

Morden, Bettie J. *The Women's Army Corps, 1945-1978*. Washington, D.C: Government Printing Office, 1990. The standard official history of the Women's Army Corps.

Morgan, Mark. "Nike Quick Look III." MSS Office of the Air Defense Center historian, 1990. A manuscript history of Nike sites with descriptions and a listing of known sites, available at the Air Defense Center and School historian's office.

Nalty, Bernard C. *Strength for the Fight: A history of Black Americans in the Military*. New York: The Free Press, 1986. An excellent history of African-Americans in the military.

Nichols, Matthew. "Ballistic Missile Defense Technology, 1945-1958." Paper presented at the 1996 Conference of Army Historians, 19 June 1996. Describes the early technology that eventually produced ABM systems.

Office of Technology Assessment. *Defense Technology Base: Introduction and Overview*. Washington, D.C: Office of Technology Assessment, 1988. A report on military technology and research capabilities, describes Army laboratories and research centers.

Owens, Patrick J. "The Road to ARDEC." MSS, U.S. Army Research and Development Center Historian's Office. A manuscript account of Picatinny Arsenal and the evolution of ARDEC.

Park, William. *Defending the West: A History of NATO*. Boulder: Westview Press, 1986. Discusses both military and diplomatic history of NATO.

Pierre, Percy A. *Equipping the United States Army: A Statement to Congress on the FY 80 Army RDTE and Procurement Appropriations*. Statement before the Armed Services Committee, House of Representatives, First Session, 96th Congress, outlining future defense requirements in view of the alarming buildup of Soviet forces during the 1970s.

Pizer, Vernon. *The United States Army*. New York: Frederick Praeger, 1967. A good description of the Army as it existed in the mid-1960s

Powell, Colin. *My American Journey*. New York: Random House, 1995. The autobiography of one of the Army's most famous Cold War generals.

Raines, Rebecca R. *Getting the Message Through: A Branch History of the U.S. Army Signal Corps*. Washington, D.C: Government Printing Office, 1996. A history of Army communications, the discussion of Army communications continues into the 1990s.

Rearden, Steven L. *The Formative Years, 1947-1950*. Washington, D.C: Government Printing Office, 1984. Part of a series on the history of the Office of the Secretary of Defense, produced by the OSD historian's office.

Reiss, Edward. *The Strategic Defense Initiative*. Cambridge: Cambridge University Press, 1992. Discusses SDI as well as previous United States efforts at ballistic missile defense.

Rolak, Bruno J. *History of the United States Army Communications Command (1964-1976)*. Fort Huachuca: U.S. Army Communications Command, 1976. An "in-house" history of the Army Communications Command, emphasizes the command's accomplishments.

Romjue, John L. *From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-1982*. Ft. Monroe: Training & Doctrine Command, 1984. A discussion of the evolution of Army fighting doctrine into the AirLand battle.

Romjue, John L, Susan Canedy, and Anne W. Chapman. *Prepare the Army for War: A Historical Overview of the Army Training And Doctrine Command, 1973-1993*. Ft. Monroe: Historical Office, Training and Doctrine Command, 1993. A collection of essays on various aspects of TRADOC history and accomplishments.

Rose, John P. *The Evolution of U.S. Army Nuclear Doctrine, 1945-1980*. Boulder: Westview Press, 1980. Describes Army doctrine for employment of tactical nuclear weapons.

Schaefer, Mason. "The Military Traffic Management Command's CONUS Port Operations Desert Shield/Desert Storm, 1990-1991." Draft manuscript in progress at the MTMC historian's office. This will be a description of the importance of MTMC ports in the deployment to the Persian Gulf. For this study it is especially useful for its description of port.

Schick, Jack M. *The Berlin Crisis, 1958-1962*. Philadelphia: University of Pennsylvania Press, 1971. A scholarly account of the Berlin crisis.

Schoonmaker, Herbert G. *Military Crisis Management: U.S. Intervention in the Dominican Republic*. Westport: Greenwood Press, 1990. A scholarly account of 1965 U.S. intervention in the Dominican Republic.

[Slattery, Thomas J.]. *The Evolution of the Army Armament, Munitions and Chemical Command*. Rock Island Arsenal: AMCCOM, n.d. A brief "in-house" description of the various organizations that preceded the creation of AMCCOM.

Sorley, Lewis. *Thunderbolt: General Creighton Abrams and the Army of His Times*. New York: Simon & Schuster, 1992. A laudatory biography of this important general.

Spiers, Edward M. *Chemical Warfare*. Urbana: University of Illinois Press, 1986. Discusses the state of chemical warfare as of 1986.

Stoessel, Walter J., et al. *Report of the Chemical Warfare Commission*. Washington, D.C: United States Chemical Warfare Review Commission, 1985. The report of a presidential commission of chemical warfare, points to Soviet improvements in chemical capability, and calls for increased NATO spending for both defensive and retaliatory measures.

Stringer, Hugh. *Deterring Chemical Warfare: U.S. Policy Options for the 1990s*. Cambridge, MA: Institute for Foreign Policy Analysis, 1986. A scholarly analysis of recent developments in chemical warfare.

Suid, Lawrence H. *The Army's Nuclear Power Program*. Westport: Greenwood Press, 1990. A scholarly account of the Army's small scale nuclear power plants.

Taylor, Maxwell D. *The Uncertain Trumpet*. New York: Harper & Brothers, 1960. Written shortly after Taylor retired as Army Chief of Staff, calls for increased attention to conventional forces which he termed the flexible response. The book influenced the incoming Kennedy administration and led to Taylor's recall to active duty as Chairman of the Joint Chiefs of Staff.

Taylor, John M. *General Maxwell Taylor: The Sword and the Pen*. New York: Doubleday, 1989. A biography of the general by his son.

Tolson, John J. *Airmobility, 1961-1971*. Washington, D.C: Government Printing Office, 1973. Part of the "Vietnam Studies" series produced by the Center of Military History. A former commanding general of the 1st Cavalry Division describes the use of helicopters, with emphasis upon the 1st Cavalry as an air mobile division.

Wagner, Louis C. "Modernization: Large Strides, Much to Do." *Army* (October, 1986), 212-214. The commanding general of the Army Materiel Command describes the force modernization efforts as of 1986.

Weigley, Russell F. *History of the United States Army*. Bloomington: Indiana University press, 1984. A classic history of the United States Army by one of the nation's foremost scholars in military history.

Weinert, Richard P. *A History of Army Aviation - 1950-1962*. Ft. Monroe: U.S. Army Training and Doctrine Command, 1991. Describes the early years of Army aviation.

Wilcox, Fred A. *Waiting for an Army to Die: The Tragedy of Agent Orange*. New York: Random House, 1983. An account of the effects of agent orange upon Vietnam veterans, and bureaucratic roadblocks in recognizing the effects of agent orange syndrome.

Wilkes, Owen, et al. *Chasing Gravity's Rainbow: Kwajalein and U.S. Ballistic Missile Testing*. Canberra, Australia: Nautilus Pacific Research, 1991. Highly biased and critical of United States missile testing activities, nonetheless contains useful factual information.

Wirls, Daniel. *Buildup: The Politics of Defense in the Reagan Era*. Ithaca: Cornell University Press, 1992. Emphasizes the political considerations influencing military spending during the 1980s.

Wiseman, Robert S. *Conquest of Darkness by Management of the Stars*. Martin Marietta, Inc., 1991. Emphasizes the development of night vision devices.

Yoshpe, Harry B. "The Impact of Unification (Draft)." Office of Chief of Transportation Historical Report #6. MSS Office of the MTMC historian. Part of a manuscript series of histories produced by the Office of the Chief of Transportation during the 1950s, it is available at the MTMC historian's office.

_____.. "Traffic Management." Office of the Chief of Transportation Historical Report # 13. MSS Office of the MTMC Historian. Part of a manuscript series of histories produced by the Office of the Chief of Transportation during the 1950s, it is available at the MTMC historian's office.

Personal Telephone Communications

Anderson, Carol, Fort Lee, VA. 12 June 1996.

Atwood, Kate, New England District USACE. 7 August 1996.

Austin, Steven, Fort Worth District, USACE. 6 August 1996.

Bennett, Clara, Army Research Laboratory (formerly Harry Diamond Laboratories, MD). 7 August 1996.

Blick, David, Aberdeen Proving Ground, MD. 16 September 1996.

Boyko, Wayne, Fort Bragg, NC. 24 June 1996.

Blakney, Carol Lynne, Anniston Army Depot. 27 August 1996.

Burton, Robert, White Sands Missile Range. 7 August 1996.

Didier, Randy, Tobyhanna Army Depot, PA. 17 September 1996.

Dunn, Danny, Redstone Arsenal. 6 August 1996.

Fowler, Libby, Pine Bluff Arsenal. 20 July 1996.

Garrahan, Terry, Natick RDE Center, MA. 6 August 1996.

Givens, Dottie, Mobile District, USACE. 7 August 1996.

Gluana, Delores, Yuma Proving Ground. 7 August 1996.

Gregory, James, Fort Belvoir, VA. 26 June 1996.

Heida, Nancy, Detroit Arsenal. 6 August 1996.

Hughes, Kaylene, Historian, Missile Command. 16 September 1996.

Humph, Dorothy, and Anna Gray, Fort Campbell, KY. 24 June 1996.

Jackson, Jack, Fort Hood, TX. 17 June 1996.

McDaid, Chris, Training & Doctrine Command, Fort Monroe, VA. 17 June 1996.

McGuff, Paul, Fort Lewis, WA. 14 June 1996.

Martin, Frances, Historian, U.S. Army Space and Strategic Defense Command. 16 September 1996.

Murray, John, Fort Huachuca, AZ. 8 August 1996.

O'Brien, Patrick, and Clair Thomas, McAlester Army Ammunition Plant, OK. 29 August 1996.

Owens, Patrick, Historian, Armament RDE Center. 29 August 1996.

Pierce, Joseph, Fort Devens, MA. 17 June 1996.

Quinn, Randy, Letterkenny Army Depot, PA. 27 August 1996.

Rhodes, Patricia, Historian, U.S. Army Air Defense Artillery Center. 15 October 1996.

Rice, Timothy, Fort McClellan, AL. 1 July 1996.

Schenian, Pamela, Fort Knox, KY. 24 June 1996.

Shields, Richard, Fort Riley, KS. 12 June 1996.

Smart, Jeffery, Historian, Chemical and Biological Defense Command. 7 August 1996.

Smith, Roger, Fort Dix, NJ. 12 June 1996.

Sturdy, Jerry, Fort Chaffee, AR. 14 June 1996.

Swift, Jim, Fort Rucker. 1 July 1996.

Tanigawa, Verne, U.S. Army Pacific. 16 September 1996.

Venable, Eugene, Historian, Army Medical Command. 8 July 1996.

Vogele, Louis, Fort Sill, OK. 26 June 1996.

Wright, Burton, Historian, U.S. Army Chemical School. 7 August 1996.

Zagzoug, Ehab, Fort Monmouth, NJ. 29 August 1996.

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APPENDIX C: EVOLUTION OF MAJOR COMMANDS

Materiel Development and Wholesale Logistics

1945 The Army technical services (Ordnance, Signal, Quartermaster, Transportation, Engineers, Chemical Warfare, and Medical) were responsible for logistics within areas of specialization.

1962 Army Materiel Command was created to assume the logistical responsibilities of the technical services.

Training and Doctrine

1945 At the close of World War II, the Army Ground Forces commands most schools except for the technical services (the technical services operate schools for their areas of responsibility).

1948 The Army Field Forces replaces the Army Ground Forces; the Field Forces supervises schools rather than exercises command. The technical services continue to operate schools for their areas of responsibility.

1955 The Continental Army Command was created as the successor to Army Field Forces. This organization exercises command over the training and doctrine school system and the technical services continue to operate their own school systems.

1962 The Continental Army Command assumes command over schools previously operated by the technical services.

1973 The Continental Army Command divided into the Training and Doctrine Command for schools and doctrine, and the Forces Command for operational forces.

Operational Forces

1945 At the close of World War II, the Army Ground Forces commands all operational forces within the continental United States.

1948 The Army Field Forces replaces the Army Ground Forces. This organization exercises staff supervision rather than command.

1955 The Continental Army Command replaces the Army Field Forces; it commands operational forces.

1973 The Continental Army Command is divided into the Training and Doctrine Command and Forces Command; Forces Command commands operational forces.

Air and Ballistic Missile Defense

1950 The Army activates Army Antiaircraft Artillery Command.

1957 The name is changed to the U.S. Army Air Defense Command.

1974 The Air Defense Command is de-activated. The Ballistic Missile Defense Organization conducts the research mission for ballistic missile defense.

1985 The U.S. Army Strategic Defense Command is activated as part of President Reagan's Strategic Defense Initiative.

Communications

1945 The Chief Signal Officer and Signal Corps are responsible for all Army communications at the opening of the Cold War.

1962 The technical services are terminated; but the Chief Signal Officer retains responsibility for strategic communications systems.

1964 The Army Strategic Communications Command is activated to operate global communications systems. The Chief Signal Officer becomes Chief of Communications-Electronics, a staff officer.

1973 The command is renamed the Army Communications Command.

1984 The name is changed to the Army Information Systems Command to reflect increased range of responsibilities.

Intelligence

1945 The Signal Security Agency is redesignated the Army Security Agency. It now reports directly to the Army staff.

1965 The U.S. Army Intelligence Command established with responsibility for counterintelligence within the continental United States.

1974 The U.S. Army Intelligence Agency replaces the U.S. Army Intelligence Command.

APPENDIX D: U.S. ARMY COLD WAR TIMELINE U.S. ARMY COLD WAR

TIMELINE*

1945-1950

The US policy toward what appeared to be a Soviet Union policy of communist expansion was focused on containing its spread and blocking its further influence. This included supporting those countries to which communism had not spread, but not sending troops to those countries where it was taking a stronghold--such as China. Principally the US government chose to provide economic aid as a means of alleviating conditions which might be conducive to communist expansion. However, the threat of ground and nuclear war that the US could wage was useful in preventing the spread through western Europe and parts of the Middle East.

The military policy during this period did not align itself with changes in US political policy or the reality of the world situation. "While foreign policy was being adjusted to a new opponent and a new kind of conflict, military policy was being developed mainly with earlier enemies and an all-out war in mind" (American Military History). President Truman attempted to establish a requirement for one year of military training for all men reaching the age of 18. This was debated for many years in Congress and not enacted. Therefore, the ability to provide additional strength to the Regular Forces remained with the Reserves and National Guard. What was not taken into account was the fact that, due to technological advances which sped up the pace of mobilization and decreased the ability to contain warfare to small geographic areas, the military could not allow itself the luxury of time or distance to train troops once a conflict had begun. It is clear that the military was relying principally on the American threat of using its atomic arsenal rather than concentrating on the possibility that lesser conflicts might make that threat irrelevant.

1945

- Potsdam Conference
- Truman inaugurated following the death of Roosevelt.
- Bombing of Hiroshima and Nagasaki
- United Nations established.
- *Four million of the eight million men in the Army are released from service.*
- *Army establishes a post-war goal of a Reserve and Regular army capable of mobilizing four million men within one year of the outbreak of future wars. This figure was later revised to 1.5 million on the ground and in the air.*
- *Army occupies Korea south of the 38th parallel in September.*

* Italicized bullets refer specifically to the Army.

- December meeting of foreign ministers reveals that USSR has no intention of allowing a provisional, unified government in Korea unless it is communist dominated.

1946

- Winston Churchill's Iron Curtain speech

- Civilian-run Atomic Energy Commission is founded by the United States with the purpose of controlling all nuclear developments including warheads.

- Negotiations are begun to found the North Atlantic Treaty Organization (NATO). The military arm of NATO is to be known as the Supreme Headquarters, Allied Powers Europe.

- The Marshall Plan is developed to provide Europe with economic recovery. The Soviet Union and Eastern Block countries choose not to participate and USSR forms Cominform, a committee to coordinate European communist parties in order to stop the threat of American imperialism, as symbolized by the Marshall Plan.

- *Army reduces its strength to two million by mid year.*

- *The Pre-war structure of the Army is restored with a General Staff and five equal divisions of the General Staff (Personnel and Administration; Intelligence; Organization and Training; Service, Supply, and Procurement; and Plans and Operations).*

- *The Army experiments with captured V1 and V2 missiles at White Sands Proving Ground.*

1947

- The Truman Doctrine is announced. It promises US aid to free peoples who are resisting attempted subjugation, by armed minorities or outside pressures. Initial focus is on countries where the USSR was attempting to finance and arm internal communist revolutions (specifically in Greece, Turkey, and Iran).

- *The wartime draft expires. By July 1, Army consists of a volunteer body of 684,000 ground troops and 306,000 airmen.*

-

- The National Security Act is passed (Public Law 253, 80th Congress).

    - o Established the Air Force (renamed from the Army Air Corps) as a separate and equal service;

    - o Designated the Air Force, Army, and Navy as executive departments headed by civilian secretaries;

    - o Created a National Military Establishment which was headed by a civilian Secretary of Defense with Cabinet ranking and included the Departments of the Army, Navy, and Air Force and the Office of the Secretary of Defense. The Joint

Chiefs of Staff were the military chiefs of each of those divisions. They served as military advisors to the President, National Security Council, and Secretary of Defense and were responsible for formulating joint military plans and establishing unified commands.

- o Created the National Security Council comprised of the Secretary of State, Secretary of Defense, the three service secretaries, and heads of other government agencies to develop co-ordinated diplomatic, military, and industrial plans; to recommend integrated national policies to the President; and to guide the execution of those policies.

- o Established the National Security Resources Board to handle the issues of industrial, manpower, and raw material mobilization in support of the overall national strategy.

- o Established the Central Intelligence Agency (CIA) as the successor to the Office of Strategic Services.

- o Established the Research and Development Board to coordinate military research and development projects.

- o Created the Munitions Board which was to integrate and standardize activities such as supply and logistics, transportation, and industrial mobilization plans.

- US puts question of Korean occupation and future before the UN's General Assembly in September.

- Joseph Stalin orders the development and production of transatlantic missiles.

1948

- Brussels Treaty is signed by Belgium, France, Luxembourg, the Netherlands, Great Britain, and the US. The purpose of the treaty is to build a common defense military force and to increase economic and cultural ties.

- Communist coup in Czechoslovakia

- USSR begins the Berlin Blockade with the intention of forcing US, French, and British occupation forces out of the city. US responds with the Berlin Airlift.

- *Congress votes to renew the Selective Service, but very few men are drafted prior to the Korean Conflict.*

- *As a result of the Key West agreement on roles and missions, Army receives primary responsibility for conducting operations on land, supplying anti-aircraft units to defend the US against air attack, and providing occupation and security garrisons overseas. The Army Ground Forces are redesignated as the Army Field Forces.*

- The Women's Armed Services Integration Act provides for women in the Army (and other services) during peacetime.

1949

- USSR lifts Berlin Blockade

- NATO is formally established with the signing by the participating countries. The Treaty is ratified by the US Senate in July.

- The USSR explodes an atomic bomb.

- The communist take-over of China is completed.

- Amendments to the 1947 National Security Act, also known as the Defense Reorganization Act of 1949,

    - converts the National Military Establishment into the Department of the Defense, unifying all of the armed forces under a single cabinet-level position, thereby eliminating what had become confusing lines of authority;

    - reduces Department of the Army from an executive department to a military one;

    - adds a chairman to the Joint Chiefs of Staff;

    - gives the Secretary of Defense the authority and responsibility to serve as the coordinator of the three services;

    - establishes the National War College, Armed Forces Staff College, and Industrial College of the Armed Forces;

    - and, under Title IV, orders the establishment of uniform budgetary and fiscal procedures throughout the Department.

- *Role of the Army is to provide ground troops to the unified command here and abroad, manage reserves, and deploy shorter-range tactical nuclear weapons in Europe. Remains responsible for administering, training, and supporting its own forces.*

- *The Department of the Army serves as the executive agency for the Mutual Defense Assistance Program, a program put into place by the UN to consolidate existing NATO military programs to assist host countries in developing their new armed forces.*

- The UN decides to hold democratic elections in Korea. The USSR refuses to participate or to allow elections above the 38th parallel. The UN sponsors the elected government south of this parallel and the Republic of Korea is established. The USSR responds by establishing a communist government in the north and then withdrawing their occupation troops. The US

does the same by mid 1949, but leaves military advisors behind to train the new South Korean military.

- **1950s**

- This period saw a shift in attitudes toward the role of the military in foreign policy due to the threat of nuclear war. Whereas earlier the military was seen as a force to be used when the country was directly threatened, now the military was seen as an indispensable partner in developing foreign policy. It was used as the muscle behind being seen as the leader and protector of the free world--a logical and necessary extension of politics. (Am. Mil. Hist.) Within the military, the debate which occupied much of the decade related to general versus limited war, nuclear versus conventional war, and combinations thereof (ditto).

- The end of the war in Korea brought on a New Look within the armed forces which was defined by an emphasis on nuclear air power rather than a commitment of ground troops. This would result in an extensive build-up of the nuclear arsenal by each of the armed forces.

- *Army begins to develop its air-mobility concept with the first helicopter units. This was the initial step toward the extensive aviation capabilities of the Army .*

1950

- Sino-Soviet Pact for mutual friendship and defense signed.

- Uniform Code of Military Justice enacted by Congress

- Truman directs armed forces to eliminate segregation by race

- *Army makes Redstone Arsenal, Alabama its center for rocket and missile research.*

- *Army organizes the Antiaircraft Command, to coordinate air defense of the continental United States. At first, the Army relied upon 75mm antiaircraft guns*

- *Army becomes involved in the Korean Conflict after US combat troops are withdrawn and North Korean communist army invades South Korea. In November, the 38th Parallel is established as the North-South Korean border.*

- *The Army Reorganization Act of 1950*

    - *confirmed the power of the Secretary of the Army to administer departmental affairs,*

    - *provided that the Army Chief of Staff was responsible for Army readiness and for carrying out the Army's policies,*

- *o provided that the Chief of the Army Field Forces was responsible for developing tactical doctrine,*
- *o divided the continental US into six Army Areas,*
- *o created three combat arms: the infantry, armor (formerly the cavalry) and artillery (which was formed from the old field artillery, coast artillery, and anti-aircraft artillery), and*
- *o created 14 services or corps.*

1951

- Korean Conflict reaches a stalemate.
- General McArthur is relieved of his duties.

1952

- US explodes first hydrogen bomb.

1953

- Eisenhower is inaugurated.
- *Eisenhower defense policy, characterized as the "New Look," emphasizes nuclear deterrence rather than the use of conventional forces. The policy is criticized by Army leaders.*
- Chinese and North Koreans enter into peace treaty talks.
- USSR explodes H-bomb
-
- Reorganization Plan No. 6 is enacted. It authorizes the Secretary of Defense to have six additional Assistant Secretaries and gives the Secretary of Defense "full and complete authority, subject only to the President and certain specific (statutes), over the Department of Defense, all its agencies, subdivisions, personnel...there are no separately administered preserves in the Department of Defense."
- Eisenhower issues Executive Memoranda which
  - o *reduced the number of deployed Army forces contingent on their being "capable of rapid airlift redeployment to forward-based heavy equipment and supply bases overseas* (Borklund);
  - o provided for military response of the US' choosing, rather than an "in-kind" response; and

- o called for a strategy to contain communism to those countries which were already under its control.

- *The Army introduces a 280 mm artillery piece, the so-called atomic cannon.*

- *Army introduces the Corporal missile as a theater weapon.*

- *General Matthew Ridgway becomes Army Chief of Staff. His service is characterized by disagreements with the Eisenhower administration over the US reliance upon massive nuclear deterrence. His argument being that once the Soviets reach nuclear parity with the US, then nuclear war will be prevented, but US troops will not be prepared for conventional warfare since the administration was not placing enough emphasis on troop training.*

- *The Army has a strength of 1.5 million men in 20 combat divisions. The $13 billion budget represent more than 30% of the overall military budget.*

1954

- The Communist Party is outlawed in the US.

- *The Army completes its desegregation program.*

- The French are defeated by the North Vietnamese army at Dien Ben Phu. North Vietnam signs an armistice pact to respect the boundaries of its neighboring countries, but soon invades Cambodia and Laos to build the Ho Chi Minh Trail, a military support and transportation route.

- Geneva Conference sets up North and South Vietnam as two separate countries.

- The Southeast Asia Collective Defense Treaty (SEATO) is signed as a southeast Asian counterpart to NATO.

- The White House orders the Pentagon to begin a top-priority program to develop and deploy land-based intermediate range ballistic missiles (IRBMs) and intercontinental ballistic missiles (ICBMs).

- *The first Army helicopter battalion is activated.*

- *Army establishes its own aviation school at Camp Rucker (redesignated Ft Rucker), Alabama.*

- *The Nike-Ajax becomes the first of the Army's surface-to-air missiles, designated primarily for defense of the United States.*

- 1955

- The Warsaw Pact is signed

- The US conducts its first civil defense exercise.

- US demonstrates that it can orbit a satellite.

- The US and USSR admit at a Geneva summit that full-scale nuclear war would obliterate their countries. Summit ends with the feeling that neither side would resort to general nuclear war unless threatened.

- *The Army Field Forces are reorganized as the Continental Army Command (CONARC) in order to reduce the number of commands reporting to the Chief of Staff. The principal function is to supervise training of the active army and the Reserves, planning for the future development of the army, and planning and conducting ground defenses in the US.*

1956

- Khrushchev makes it clear that although he feels that communist and capitalist countries can co-exist, the USSR would continue to support peoples attempting to overthrow colonial, imperialist, and capitalist powers.

- Suez crisis leads to USSR becoming major provider of military equipment to Egypt, Syria, and Iraq.

- USSR sends troops and tanks into Poland, Czechoslovakia, and Hungary to quell resistance and uprisings against the communist governments.

- *Jupiter Intermediate Ballistic System transferred from Army to Air Force. Army limited to missiles with 200-mile range. Continue to control some tactical nuclear weapons and, later, medium-range missiles (Lance, Pershing, ground-launched cruise missiles).*

- *The Secretary of Defense gives the Army responsibility for air defense missiles with a range of 100 miles or less, in effect giving the Army the lead for antiaircraft missiles.*

- *The first Redstone missile is launched at White Sands Proving Ground.*

1957

- Congress passes a Joint Resolution which comes to be known as the Eisenhower Doctrine. It pledges military assistance to Middle Eastern nations fighting the threat of communism and authorizes the President to use the armed forces.

- USSR announces successful test of its ICBM--one year ahead of US Air Force ICBM test.

- Sputnik is launched by the USSR.

- US Congress criticizes the Pentagon for allowing the bomb and missile gap between the USSR and the US to develop.

- *The Strategic Army Corps was designated. It consisted of two airborne and two infantry divisions who were maintained in a high state of readiness at all times.*

1958

- Eisenhower sends the military to Lebanon to quell pro-Nassar rebellion against the Lebanese government. All American forces withdrawn by October.

- Eisenhower authorizes Minuteman Missile Program

- Department of Defense Reorganization Act of 1958 is enacted

    - o strengthening the power of the Secretary of Defense,

    - o lessening the autonomy of each of the military departments,

    - o specifying that each military department is to be separately organized under its own Secretary, and

    - o strengthening the CIA.

- *The Army consisted of 900,000 troops in 15 divisions. The budget of $9 billion represented about 22% of the military budget.*

- 1959
- Cuban Revolution begins in earnest.

1960s

As the threat of all-out nuclear conflict lessened, it became apparent that the US was more likely to get involved in local conflicts rather than large-scale, general ones.

- *Army develops and applies air-mobility concept in the use of combat helicopters. During Vietnam War, Army maintains more aircraft than the Air Force. Maintains ready-reaction force in the XVIII Airborne Corps for deployment anywhere in the world except Europe and Korea.*

1960

- US U-2 Reconnaissance spy plane shot down by USSR

- October-December: Eisenhower decides to leave three issues to incoming President Kennedy:

- o Whether to proceed with CIA-sponsored invasion of Cuba by Cuban refugees,

- o how to respond to the increasing number of North Vietnamese invading troops in Cambodia and Laos, and

- o how to respond to increasing Cuban and Soviet-sponsored revolutionary activity in Central America, specifically Nicaragua, Panama, and Guatemala.

- *Maxwell Taylor, Ridgway's successor as Army Chief of Staff, releases his book, The Uncertain trumpet, which again questions US reliance upon massive nuclear deterrence.*

- 1961
- Kennedy inaugurated.

- The unsuccessful Bay of Pigs invasion of Cuba is financed by the CIA and undertaken by CIA-trained refugees.

- With the assumption that the USSR's nuclear capabilities will soon equal that of the US, the strategic nuclear war deterrence policy was revised from Assured Destruction (AD) to Mutual Assured Destruction (MAD).

- The USSR erects the Berlin Wall in response to Kennedy's refusal to remove US troops from West Berlin. *Army Reserves and National Guard are mobilized in response to crisis.*

- Kennedy increases US presence in Southeast Asia by strengthening Marine and Air Force units in Thailand and sending thousands of military advisors to South Vietnam to train their army. The first American casualty occurs at the end of the year.

- First successful minuteman missile test flight

- Minuteman I goes on alert

- The U.S. Strike Command is organized. It is comprised of the Strategic Army Corps and the Air Force Tactical Air Command. Other common support or logistics activities are also created, including the Defense Supply and the Defense Intelligence Agency.

1962

- The number of US military advisors to South Vietnam increases to between 20,000 and 60,000 following the execution of Army generals by the South Vietnamese president.

- The Cuban Missile Crisis. *Following confirmation that USSR IRBMs with nuclear warheads were being placed in Cuba, the Army moves one armored and one mechanized infantry division to Miami.* Other military services, including the Navy and the Air Force go on full alert. Kennedy blockades Cuba. Khrushchev backs down and withdraws the missiles following

Kennedy's promise to 1) withdraw US *Jupiter* IRBMs from Turkey, 2) allow Soviet warships and submarines to use Cuban ports, and 3) promise not to overthrow the Cuban government.

- *Secretary of Defense Robert McNamara directs the consolidation of the technical services into the Army Materiel Command.*

1963

- Hotline links USSR and US.
- The Limited Test Ban Treaty is signed.
- Ngo Dinh Diem, president of South Vietnam, overthrown in U.S. supported coup.
- Johnson is inaugurated following Kennedy's assassination.

1964

- The Gulf of Tonkin Resolution is passed which launched the US bombardment of North Vietnam and changed the US military mission from training the South Vietnamese Army to search and destroying the North Vietnamese and the South Vietnamese Viet Cong.
- *The first Army ground troops are sent to South Vietnam to support the effort to contain the communist spread.*
- China detonates its first atomic bomb.

1965

- US air campaign against North Vietnam begins with Operation Rolling Thunder.
- *With the arrival of the 173rd Brigade, American combat units begin moving into Vietnam in large numbers to begin offensive operations against the Viet Cong and the North Vietnamese Army. By the year's end, American military strength reaches 175,000. Army forces create the logistical infrastructure necessary to support large number of troops.*
- US Marines and the 82nd Airborne Division are sent to the Dominican Republic to quell a communist insurrection.

1966

- Minuteman II goes on alert
- US build-up and offensive operations continue in Vietnam. Despite official optimism, decisive action proves elusive.

1967

- The Hotline is activated during the Arab-Israeli Six-Day War. Johnson sends a naval fleet to the Mediterranean, but the war ends before any confrontation with the USSR could happen.

- Egypt ousts its Soviet military advisors.
- Federal forces move to Detroit to quell riots.
- NATO adopts Flexible Response strategy

1968

- Tet Offensive results in General Westmoreland requesting and receiving 100,000 additional troops.
- North Korea captures the US *Pueblo*.
- Czech uprising is quelled when Soviet tanks and troops arrive.
- Strategic Arms Limitation Treaty I (SALT I) talks begin
- Nuclear Arms Nonproliferation Treaty signed
- *Active Army units involved in riot duty across the US in the wake of the Martin Luther King, Jr. assassination.*
- *A mysterious accident at Dugway Proving Ground, a US Army Chemical Research Facility, kills sheep at a nearby ranch.*

1969

- Nixon inaugurated.
- Secretary of Defense Melvin Laird sets two goals for the Nixon Administration term:
    - o Abolish the draft and establish an all-volunteer military
    - o Phase out the US military presence in Vietnam.
- *President Nixon orders a reevaluation of U.S. chemical warfare policy. Production of chemical munitions ceases, as does research in biological warfare.*
- United States conducts the first REFORGER exercise, demonstrating American capability to airlift units to prepositioned equipment in Germany, for rapid reinforcement of NATO.
- US lands on the moon
- Libya's Qadhafi begins terrorist campaign against its noncommunist neighbors.

1970

- Minuteman III goes on alert

- *US Army crosses Cambodian border. Widespread rioting in the US on college campuses. Students killed by the Ohio National Guard at Kent State University.*

1972

- SALT I agreement ratified

- The draft ends

1973

- Yom Kippur War; US goes on worldwide alert.

- *All volunteer Army begins.*

- The US, North Vietnam, and South Vietnam sign the Paris Accords, an armistice that provides for a cease-fire, political settlement, withdrawal of remaining US forces, and the return of American POWs.
- *The Continental Army Command is replaced by two new commands: Forces Command (FORSCOM) and Training and Doctrine Command (TRADOC).*

1974

- Ford inaugurated.

- Vladivostok Accords: amended the SALT I Agreement by establishing numerically equal limits on deployed nuclear weapons.

1975

- Saigon falls to the communist forces and is renamed Ho Chi Minh City.
- Helsinki Accords: US and USSR pledge to respect current European borders, protect human rights, and promote trade.

1976

- Nuclear Test Treaty: limits size and nature of underground nuclear tests by US and USSR

- *Publication of the revised Army FM 100-5 Operations reflects changed emphasis to mechanized warfare in Europe instead of counter insurgency operations.*

- *Army reactivates Ft Irwin California, the post will become home to the National Training Center, to allow large units to practice large maneuvers.*

1977

- Carter inaugurated.

1978

- *WACs discontinued as a separate branch of the Army. Women were fully integrated into*

Army noncombat specialities.

1979

- SALT II agreement.

- Beginning of hostage crisis in Iran with the seizure of the American embassy.

1980s

- *For the U.S. Army this decade is characterized by acceleration of the force modernization process, as weapons systems and equipment first envisioned during the 1970s become operational.*

- Soviet military modernization continues through the first half of the decade as the USSR makes significant improvements in both the quantity and quality of its armed forces.

1980

- *Army Chief of Staff Edward Meyer describes the Army as the "hollow Army" in testimony before Congress*

- Soviet Union invades Afghanistan

- President Carter directs formation of the Rapid Deployment Joint Task Force in response to the Soviet invasion of Afghanistan. The principal mission is to plan for quick movement of forces to Middle East.

1981

- Reagan inaugurated.

- *Fielding begins for M-1 (Abrams) tank. Fielding of other weapons systems and equipment continues.*

1982

- Strategic Arms Reduction Talks (START): resumption of nuclear arms negotiations between USSR and US

- *The 1982 version of FM 100-5 introduces the AirLand battle concept, emphasizing rapid maneuver and offensive operations.*

1983

- Reagan proposes Strategic Defense Initiative (SDI), popularly called "star wars."

- President Reagan sends U.S. forces to Caribbean island of Grenada. Ground forces consist principally of U.S. Marines and 82nd Airborne division, plus rangers and special operations units.

1984

- *The National Training Center at Ft Irwin is fully operational. Army Chief of Staff, John Wickham pronounces the program a complete success.*

1985

- Mikhail Gorbachev rises to power in the Soviet Union. His efforts to reform the Soviet Union will eventual lead to an end of the Cold War.

- Geneva Summit: USSR and US agree to a 50% reduction in nuclear arms

- *Army activates the Strategic Defense Command to coordinate Army related SDI programs.*

1986

- Ryekjavik Summit: unsuccessful talks between US and USSR to further reduce arms

1987

- Nuclear Risk Reduction Center Agreement: USSR and US agree to promote communication and good will between the two countries

- Intermediate-Range Nuclear Forces Treaty: eliminated all mid-range and some short-range missile systems and established verification system

1989

- Bush inaugurated.

- Eastern European nations break with USSR.

The Berlin Wall comes down.