

Art of War Papers

Whose Role Is It Anyway?

**The Inter-Service Race to Develop
Intermediate-Range Ballistic Missiles**



Brennan S. Deveraux, Major, US Army



**Army University Press
US Army Combined Arms Center
Fort Leavenworth, Kansas**

The cover photo is courtesy of US Army Aviation and Missile Life Cycle Management Command, Redstone Arsenal Historical Information. Jupiter Missile AM-6B was fired from Cape Canaveral, Florida, on 17 July 1958. This was the first flight test of the complete inertial guidance system. The missile impacted on the predicted target, and its nose cone was successfully recovered less than two hours after liftoff.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the US Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)



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Program Description

The Command and General Staff College (CGSC) Art of War Scholar's program offers a small number of competitively select officers a chance to participate in intensive, graduate level seminars and in-depth personal research that focuses primarily on understanding strategy and operational art through modern military history. The purpose of the program is to produce officers with critical thinking skills and an advanced understanding of the art of warfighting. These abilities are honed by reading, researching, thinking, debating, and writing about complex issues across the full spectrum of modern warfare, from the lessons of the Russo-Japanese war through continuing operations in Afghanistan and Iraq, while looking ahead to the twenty-first century evolution of the art of war.

Abstract

This study examines the Defense Department's (DoD) management of surface-to-surface missile development in the early Cold War, building to the Army's Jupiter intermediate-range ballistic missile (IRBM) pursuit. During these efforts, emerging missile technology challenged the DoD's ability to mitigate inter-service competition and duplicative efforts. Although the Army articulated the potential of long-range missile use, it failed to justify why it should be the service to develop and operate said weapons. Instead, the Army leveraged ambiguous wording in 1950 and 1954 missile agreements and applied its land-combat function broadly, encroaching on perceived Air Force missions. This resulted in multiple services competing for finite resources and capitalizing on the then-unforeseen advantages of immature technology, ultimately resulting in redundancy. This research finds that the DoD's management of missile development in the 1950s strained a dwindling defense budget, limited the modernization of conventional capabilities, and exacerbated tenuous relationships among the service branches. While based in historical research, these findings have enduring applications, as they illuminate the dangers of ambiguous wording in a restrictive policy document, and challenge the efficacy of the Joint Chiefs of Staff and similar service-based committees as organizations for managing emerging technology. These findings are particularly applicable to modern-day DoD policy formulation, given that the Cold War IRBM controversy mirrors current inter-service tensions regarding missile development.

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Acronyms

EO	Executive Order
DoD	Department of Defense
GMC	Guided Missile Committee
INF	Intermediate-Range Nuclear Forces
ICBM	Intercontinental Ballistic Missile
IRBM	Intermediate-Range Ballistic Missile
JCS	Joint Chiefs of Staff
NSC	National Security Council
SAC-ODM	Science Advisory Committee to the Office of Defense Mobilization
SIGMB	Special Interdepartmental Guided Missiles Board
TCP	Technological Capabilities Panel
WSEG	Weapons Systems Evaluation Group

Chapter 1

Introduction

Military modernization is an expensive endeavor. Even the world's wealthiest nations are limited in the development of advanced technological capabilities. Resources are finite; for example, money that a country's navy invests in aircraft may well take away from its shipbuilding or its air force's aircraft purchases. This inherent opportunity cost creates a natural competition for scarce resources in which separate military services become proponents of their respective ways of warfare. When this inter-service competition creates redundancies, militaries become inefficient. In the context of developing military equipment, efficiency is basically the creation of a desired capability or piece of equipment with minimal waste of essential resources such as time, money, facilities, and manpower. Emerging technology can shed light on the challenge of efficient innovation, as the impact of using immature technology on the battlefield is fundamentally hard to predict. As follows, evaluating emerging technology to capitalize on technological innovation—while avoiding unnecessary effort duplication—is an enduring problem for any military organization.

For the United States, the early Cold War epitomized this type of inefficient competition as the individual military services fought for relevancy in a fiscally restrained environment with an unclear vision of future warfare. US military capabilities of the time were directly linked to the country's ability to maintain an advantage over its new competitor, the Soviet Union. As a result, any missed opportunities associated with inefficient modernization decisions had strategic implications. Missile development—the emerging technology of the time—encapsulated these modernization challenges. A 1962 declassified US Army Ordnance Missile Command report eloquently noted that military services “occupied the role of ‘bidders’ seeking developmental responsibilities. Each was sure that it had the best proposal, which fostered a highly competitive spirit.”¹ This inter-service competition culminated in 1956 with the Army's pursuit of the Jupiter missile—an intermediate-range ballistic missile (IRBM) with a 1,500-mile goal range.² This missile development choice created tension between the Air Force and the Army regarding service functions—codified responsibilities, missions, and tasks.³ Clearly, understanding the Jupiter missile's development and associated controversy will illuminate underlying issues with inter-service competition and inefficient innovation policies concerning emerging technology.

Research Question

This study examines the following question: How did Department of Defense (DoD) management of missiles as an emerging technology impact the Army's pursuit of the 1,500-mile range Jupiter missile between 1955 and 1956? Three supplementary questions support this research question: First, how did the Jupiter missile fit into the Army's established and adjusted service functions? Second, what restrictions did the DoD establish to manage surface-to-surface missile development in the 1950s, and how were they created? Third, what prompted Secretary of Defense Charles Wilson to clarify roles and missions in 1956, subsequently ending the Army's Jupiter missile project?

This research asserts that the Army capitalized on ambiguous DoD guidance regarding missile development to pursue the Jupiter IRBM—a weapon that the service struggled to operationally justify. Facing a crisis of mission and competing for limited resources, the service then heavily invested in emerging missile technology and broadly interpreted its service functions and missile-development responsibilities. In turn, the Army's continual missile range extensions created duplicative efforts that were products of sustained inter-service competition. Unfortunately, the Joint Chiefs of Staff (JCS) could not resolve these conflicts internally, and the secretary of defense—initially unable and subsequently unwilling—did not settle the matter until November 1956. In this regard, 1950s DoD management of missile development strained a dwindling defense budget, limited the modernization of conventional capabilities, and fractured an already tenuous relationship among the services.

Importance of the Research

Primarily a historical study of 1950s missile development, culminating with the Army's Jupiter IRBM pursuit, this work also analyzes emerging technology management. It adds to Cold War historical literature and potentially could influence current inter-service roles regarding emerging technology. Significantly, because the Cold War missile development challenges mirror ongoing Army and Air Force inter-service tensions regarding post-Intermediate Nuclear Forces (INF) Treaty missile development, the findings of this project are uniquely applicable to current DoD policy development.⁴ Additionally, the original inter-service missile race provides the requisite context for understanding current service arguments over missile development. Once again, historical lessons can be valuable as the United States deals with potential duplication of efforts among the services regarding missile-development responsibilities.

In a broader context, enduring lessons regarding emerging-technology management are relevant and applicable to modern militaries worldwide. A November 2020 Congressional Research Report, “Emerging Military Technologies: Background and Issues for Congress,” details the strategic importance of emerging technology in the age of Great Power competition.⁵ In the report, advanced technology and global security analyst Kelley Saylor details the political and strategic implications that emerging technologies such as artificial intelligence, autonomous weapons, and hypersonic weapons can have on the US relationship with China and Russia. Importantly, Saylor explains the challenges emerging technology presents to the DoD:

The implications of emerging technologies for warfighting and strategic stability are difficult—if not impossible—to predict, as they will be a function of many factors, including the rate of technological advancement in both the United States and competitor nations, the manner in which emerging technologies are integrated into existing military forces and concepts of operation, the interactions between emerging technologies, and the extent to which national policies and international law enable or inhibit their development, integration, and use.⁶

Overall, the management of emerging technology will undoubtedly have strategic implications for the United States.

However, this examination of service function adaptability and potentially inefficient military modernization practices cannot fully provide answers to assist the DoD in solving the complex problem of managing emerging technology. Specifically, this book does not propose a model for emerging technology management or suggest what Secretary Wilson should have done in the 1950s. Instead, historical analysis of missile-development policy can help shape current DoD management of emerging technology by identifying underlying and potentially timeless issues.

To isolate underlying themes within the Army’s Jupiter missile pursuit, this research is scoped in several ways, the first of which is timeframe. While the Army’s actual pursuit of the IRBM transpired from July 1955 to November 1956, the factors that led to the service’s decision appeared nearly a decade earlier. Therefore, this analysis starts on 26 July 1947 with President Harry Truman’s creation of the Military Establishment and service function codification. Because the research focuses on the Army’s pursuit of the missile rather than the missile’s eventual employment, this study ends on 26 November 1956, the date when Secretary Wilson clar-

ified service roles and missions via a memorandum which restricted the Army's ability to pursue an IRBM.

The purpose of this project is limited. Opening up the timeframe beyond the Jupiter missile's specific years could create clarity issues, particularly as this study does not address significant historical events that do not relate to the Army's pursuit of the IRBM. Likewise, this expanded period could result in unnecessary analysis of events that would detract from understanding the Army's Jupiter missile pursuit. In this sense, there is a direct correlation between depth of analysis and time proximity to the Jupiter missile. Specifically, the research is domestically focused. While the Soviet Union and general Cold War politics were a driving factor for military innovation and adaptation, this study analyzes the Army's actions within the DoD framework. Similarly, the Korean War and the general forward-basing of military forces undoubtedly altered decision-making at the executive level; yet without a direct tie-in to the Jupiter missile, these factors do not enhance the argument regarding the Army's decisions. This analysis, however, does explore events that directly impacted missile development, as these international issues provide necessary context. This includes the 1949 study to determine an air offensive's feasibility against the Soviet Union and the 1955 IRBM catalyst brief on the Soviet surprise attack threat. Additionally, while the Army may have had indirect or abstract motivations for its IRBM, this research focuses exclusively on the battlefield implications that the service articulated as its underlying development justification.

Lastly, the study focuses on a specific military service: the Army. While direct analysis of the Army's pursuit of the Jupiter is framed through the DoD's emerging technology management, the research's central theme for analysis is the Jupiter case study. While all the services vied for missile-development responsibilities and had their own respective projects, these efforts provide minimal context to understanding the Army's pursuit of the Jupiter. These other service projects are addressed where directly applicable to understanding missile responsibilities, keying in on ambiguity or any impact on the Army. This includes the Army's 1953 attempt to purchase the Navy's Regulus missile and the inter-service debates that followed. Similarly, numerous inter-service disputes occurred between 1947 and 1956; while important in their own right, they fall outside the scope of this project. Therefore, while often noted, these similar issues are not examined in detail unless they specifically support analysis of the Army's pursuit of the Jupiter missile. For example, this study outlines the 1948 inter-service competition between the Navy and the Air Force in terms

of assessing the ambiguity of service functions but does not highlight the details of their dispute.

Adding to the Literature

The breadth of literature covering this period facilitates detailed research as scholars and historians have studied the early Cold War in-depth and approached the period from myriad perspectives. Additionally, the US government has declassified much of the documentation around the events, allowing this information to serve as the foundation for this study. To better understand the sheer volume of information on the Jupiter missile project and its surrounding context, the literature referenced in this book is divided into three distinct sections that mirror the chapters they support.

1947–1952: The Foundation for Missile Development

The historical service functions are public records; thus, primary source documents such as the Key West and Newport Agreements and the 1950 DoD Guided Missile Directive drive this section. Richard Wolf's *The United States Air Force: Basic Documents on Roles and Missions* is an essential research tool for reviewing these key sources.⁷ This is a collection of thirty-seven essential government documents that influenced Air Force roles and missions. Wolf describes the compilation as a “useful reference work that contains primary source documents not easily obtainable elsewhere.”⁸ Although many of these documents are not relative to researching IRBMs, a select few are vital, including Secretary of Defense Wilson's 1956 range-restriction memorandum. Wolf, an Air Force Staff historian, provides a short essay for every primary source document, helping readers understand the historical context that drove decisions and policy.

In contrast to the specific impact of service functions, former Harvard political science professor Samuel Huntington's “Interservice Competition and the Political Roles of the Armed Services” takes a more holistic approach to understanding inter-service competition.⁹ He analyzes military competition's beginnings, emphasizing oversight—both military and political—and how it impacts efficiency. One unique conclusion Huntington reaches is that “interservice competition tended to weaken the military as a whole but to strengthen the military services.”¹⁰ Although the article is limited in its specifics on IRBMs, Huntington's overarching analysis on inter-service competition in the early-Cold War era remains essential to understanding modernization motivations.

In a broader context, the JCS historical series provides a unique understanding of IRBM-related decision-making at both the executive and DoD levels. Additionally, this series offers insights into key leader per-

spectives and their respective responses to policy changes. Each book's foreword explains the purpose behind the JCS directive to capture its history: "An account of [JCS] activity in peacetime and during times of crisis provides, moreover, an important series of chapters in the military history of the United States."¹¹ The second volume of the series, written by historian Kenneth Condit, analyzes the JCS from 1947 to 1949, highlighting the beginnings of inter-service competition over service functions.¹² Specifically, chapter five of this book outlines the challenges associated with the Key West and Newport agreements and their impact on service roles and missions.

Similar to the JCS historical series, the Office of the Secretary of Defense series aims to "provide a permanent and comprehensive historical record" and a "thorough, objective, critical, and analytical history."¹³ Several of the books are relevant to missile-development ambiguity. In particular, historian Steven Rearden's *The Formative Years 1947–1950* provides a useful assessment of service-function development and adaptation.¹⁴ In addition to examining the Key West and Newport conferences, Rearden analyzes early inter-service groups, such as the Armed Forces Special Weapons Project and the Weapons Systems Evaluation Group (WSEG). Important to this project, he devotes a section to analyzing the impacts of the WSEG's most influential report, a study on the feasibility of an offensive air operation against the Soviet Union.¹⁵

An essential aspect of assessing service function development and adaptation is understanding how the services viewed their respective purposes, particularly in the absence of coherent strategies. Former RAND Corporation analyst Carl Builder's *The Mask of War: American Military Styles in Strategy and Analysis* helps illuminate the underlying drivers of service decisions and competition.¹⁶ Builder's work is foundational for understanding military culture. Notably, he argues that the military services, "while composed of many, ever-changing individuals, have distinct and enduring personalities of their own that govern much of their behavior."¹⁷ This argument is important for assessing service function competition; for example, Builder's description of the Navy as an organization defined by "its independence and stature," provides context regarding the service's attempts to maintain strategic missions and develop aircraft independent of Air Force oversight.¹⁸ Builder claims that "the most powerful institutions in the American national security arena are the military service . . . not the Department of Defense or Congress or even their commander in chief, the president."¹⁹ While Builder's assessment is holistic to the services and covers a broad period, his insights provide perspective concern-

ing decisions by the services and the numerous defense secretaries in the early Cold War.

In 2019, the Rand Corporation expanded on Builder's work in *Movement and Maneuver: Culture and the Competition for Influence Among the U.S. Military Services*.²⁰ Authors Rebecca Zimmerman, Kimberly Jackson, Natasha Lander, Colin Roberts, Dan Madden, and Rebeca Orrie analyze "organizational influences at the military service level and the types of responses they typically engender when the services are under pressure."²¹ Importantly, their project attempts to understand "how the military would respond and adapt to major shocks, such as major policy shifts or watershed events."²² Similar to Builder, the Rand authors provide context regarding how individual services understand their respective roles in a potential conflict, resulting in competition over resources and service functions.

For the Army specifically, Walter Kretchik's *U.S. Army Doctrine: From the American Revolution to the War on Terror* provides a detailed analysis of Army doctrine from the service's founding until the early twenty-first century.²³ Through his research, Kretchik, a Western Illinois history professor, strove to "ascertain the fundamental characteristics of army doctrine and to judge its impact in preparing the service to accomplish its missions in both domestic and foreign venues."²⁴ His analysis of the development of post-World War II Army doctrine and the revisions to the service's operations manual is particularly relevant to this project. He outlines the differences between 1944, 1949, and 1954 plans for conducting land operations, and assesses the impact that missiles had on these transitions. Kretchik points to the "Army leadership's grudging admission that regulating the chaos of war through doctrine required continually adjusting its tactical concepts to ever-changing technology."²⁵

Significantly, one underlying motivation for the Army's missile pursuits centered on overcoming its reliance on the Air Force for close support and interdiction missions. The Air Force gained service status in 1947 and continued developing its identity during the early Cold War. Retired Air Force Col. and former George Washington University history professor John Schlicht's *Help from Above: Air Force Close Air Support of the Army 1946–1973* explores the development of said identity and the challenges of differing service views regarding aircraft employment.²⁶ He describes disagreements between the services over the most practical use of airpower, highlighting Air Force views on striking strategic targets close to an enemy's power versus the Army's desire to have the "aircraft to serve only as umbrellas over the ground troops."²⁷ He argues that the Army in-

tion was for aircraft to support ground forces and their missions, while the Air Force viewed its mission as independent and, in the beginning of the nuclear age, the decisive form of warfare. For this study specifically, Schlight's analysis of the continual service tensions regarding close air support provides context concerning the Army's frustration with Air Force support, and the justification behind the Army's continual push for overlapping capabilities through missile development.

Although the WSEG is not examined in detail in this project, it was a prominent inter-service organization and directly impacted the inter-service missile competition. A valuable source for understanding this organization and its impact on the JCS is John Ponturo's "Analytical Support for the Joint Chiefs of Staff: The WSEG Experience, 1948–1976."²⁸ Ponturo—a research analyst at the Institute for Defense Analyses—conducted his research to “assess the factors that affected WSEG’s usefulness as a source of analytical support for the JCS” and “derive lessons from the WSEG experience that may be of value in providing for such support in the future.”²⁹ In his report, Ponturo reviews nearly thirty years of WSEG actions, including interviews with essential employees; the report also contains the WSEG’s initial establishment directive from December 1948.³⁰ Ponturo analyzes the organization’s development over time, from an essential element of a relatively small DoD to a more diverse research body.

Likewise, one of the most significant events during this period was the signing of the 1950 missile-development agreement. In *The Development of Ballistic Missiles in the United States Air Force 1945–1960*, historian Jacob Neufeld unpacks how missiles were developed in the Air Force.³¹ His in-depth report—an official history of the US Air Force—covers the initial conception of missiles and how the Air Force viewed them. Importantly, Neufeld examines the lead-up to Secretary of Defense Louis Johnson’s approval of the 1950 missile agreement, to include the establishment and study conducted by the Special Interdepartmental Guided Missiles Board (SIGMB).³²

1953–1954: The Inter-Service Missile Competition

Paramount in assessing the service’s pursuit of the Jupiter missile is the Army’s vision of future warfare and its operational missile requirements. Historian Andrew Bacevich’s *The Pentomic Era: The U.S. Army Between Korea and Vietnam* is the foundational literature for understanding the Army during this period.³³ Bacevich, a Boston University history professor and retired Army colonel, discusses Army challenges during the Dwight Eisenhower presidency, noting that “new technology, changing views of the nature of war, and the fiscal principles of the Eisenhower

administration produced widespread doubts about the utility of traditional land forces.”³⁴ Bacevich details the Army’s struggle to define its new role on the battlefield and, more importantly, how it attempted to reinvent itself through force restructuring and its rapid innovation and employment of new nuclear delivery systems. Of note, Bacevich argues that the Army did not embrace this mission. He discusses how the service privately and publicly criticized the nuclear warfare concept, which was a framework in which the Army was not the primary actor.

Brian Linn builds on Bacevich’s work with *Elvis’s Army: Cold War GIs and the Atomic Battlefield*, providing a detailed analysis of the US Army’s early-Cold War transitional period and a more thorough review of the Army’s challenges during this time.³⁵ Linn, a Texas A&M history professor, identifies critical tasks the service needed to accomplish to maintain its relevancy. Importantly, he details the Army’s growing vision of the nuclear battlefield and its impact on how the service would fight a future war, essential information to understand the Army’s missile pursuits. Linn identifies the Army’s struggle to find an identity—an underlying theme of the period—and how this likely impacted both inter-service competition and missile development.

In addition, from an artillery-specific perspective, military historian Janice McKenney analyzes the innovation and adaptation of indirect-fire capabilities since its founding in *The Organizational History of Field Artillery 1775–2003*.³⁶ The book provides an excellent framework for understanding US indirect-fire adaptability. McKenney argues that “with technological breakthroughs in the development of nuclear warheads, the Army, which stood the most to lose with the downgrading of its conventional forces, made a special effort to share prominently with the other services in the development and employment of missiles and rockets.”³⁷ Her work outlines the Army’s tactical nuclear weapons specifications and timelines, including a detailed analysis of specific delivery systems that predated the Jupiter missile projects, such as the Corporal and Redstone missiles. McKenney’s overarching examination of artillery innovation and development provides a broader historical perspective of the IRBM inter-service competition period.

In terms of missile development, this two-year period was heavily influenced by the Army’s gradual extensions of its missile requirements and the development of the 1954 missile agreement. Historian Robert Watson describes the actions that shaped the JCS decisions regarding missile development in *The Joint Chiefs of Staff and National Policy 1953–1954*.³⁸ He emphasizes the resurgence of inter-service competition regarding service functions and addresses the disagreement over the development of

guided missiles. His analysis of the 1953 Regulus missile controversy and the subsequent adjustments to the JCS missile-development agreement is essential for understanding the Army's eventual pursuit of the Jupiter missile. As a complement to Watson's research, author Elliot Converse's *Rearming for the Cold War 1945–1960* assesses the Army's purchase of the Regulus missile from the Navy.³⁹ His historical review of Army acquisition and research and development illuminates the Guided Missiles Office's challenges and the relationship that its director, Kaufman Keller, had with the services.⁴⁰

While missiles were increasingly important in the early 1950s, the Technological Capabilities Panel (TCP) directly tied missiles—particularly intercontinental ballistic missiles (ICBM) and IRBMs—to the national strategy. In “James Killian, the Technological Capabilities Panel, and the Emergence of President Eisenhower's ‘Scientific-Technological Elite,’” Mississippi State professor Richard Damms provides an in-depth analysis of the TCP's founding and its impact on the relationship between science and strategy.⁴¹ He details the challenges of integrating science and technology into Truman and Eisenhower administration policies and concludes that while “American science was becoming increasingly militarized” after WWII, the TCP set the foundation for an independent science advisory committee to the White House and the National Security Council (NSC).⁴² The TCP assessed the growing Soviet Union threat and made clear, tangible recommendations to the president, many of which facilitated policy decisions in subsequent months, directly impacting IRBM development.

David Snead's *The Gaither Committee, Eisenhower, and the Cold War* provides additional information regarding the TCP and how science and research helped shape policy.⁴³ President Eisenhower formed the Gaither Committee after Secretary Wilson clarified missile-development responsibilities. Snead—a history professor at Liberty University—assesses the TCP as a foundational organization for the Gaither Committee and others like it. Significant to this study, Snead articulates the TCP's planning assumptions and conclusions:

The Killian committee concluded that advances in delivery capabilities posed a greater threat than improvements in nuclear weaponry . . . with the imminent emergence of virtual equality in the field of nuclear weaponry, advances in delivery systems became pivotal in the military balance of power between the Soviet Union and the United States.”⁴⁴

As a result, missiles—an alternative nuclear delivery system—became essential to US national security.

The influence of the TCP highlights the important role scientists played in shaping Cold War policy. Sarah Bridger, a history professor at Cal Poly, adds a unique perspective to the challenges scientists faced in this endeavor in *Scientist at War: The Ethics of Cold War Weapons Research*.⁴⁵ Although her book only briefly addresses the TCP and the strategic rise of missiles, Bridger provides a historical look at the militarization of science and the ethical considerations of innovation and policy recommendations.

1955–1956: The Jupiter Missile Controversy

A small number of books explicitly examine IRBM inter-service competition and, therefore, heavily influenced this project. Former US ambassador Michael Armacost's *The Politics of Weapons Innovation: The Thor-Jupiter Controversy* is a prime example and a key source for any Jupiter missile research.⁴⁶ Similar to this study, Armacost approaches the issue through the lens of inter-service competition. He provides a detailed analysis of the political aspects of weapons innovation during the 1950s, and recognizes the services themselves as political actors. Although his emphasis is on the bureaucratic interworking that drove innovation, Armacost explains the “why” behind IRBM development. This project builds on Armacost's analysis by framing the problem institutionally, as opposed to focusing on the services as primary actors. Specifically, the present study emphasizes how the executive branch and the DoD impacted inter-service competition through service functions and decision-making concerning emerging technology.

For the Jupiter project specifically, the 1962 US Army Ordnance Missile Command's “History of the Jupiter Missile System” is a crucial piece of literature.⁴⁷ Written by historians James Grimwood and Frances Strowd, the report—declassified in 1978—provides a historical narrative of inter-service competition challenges in the 1950s. Grimwood and Strowd establish a developmental timeline from the Army's identification of a capability need through actual Jupiter Missile production. Importantly, they outline how defense policy changes directly impacted the development process.

It is important to note that missiles were not developed simply as a novel technology, but instead served a strategic purpose. For IRBMs specifically, it is imperative to place the weapon's development within the context of its intended purpose and planned deployment. Military history professor Gates Brown's *Eisenhower's Nuclear Calculus in Europe: The Politics of IRBM Deployment in NATO Nations* adds to the IRBM literature in this way. Brown focuses on the strategic importance of IRBMs, specifically how they were deployed in the broader US strategy. He casts

a favorable light on IRBM effort duplication as, strategically, it led to the rapid missile production and capitalized on emerging technology. Brown mainly emphasizes the European theater and the importance of IRBM deployment—outside the scope of research on inter-service competition—but also holistically discusses its impacts on the services, specifically its effect on their respective relevancy and morale. He argues that the IRBM competition “was not just a technical discussion but also a disagreement at a fundamental level concerning which service was primarily responsible for national security, the Army or the Air Force.”⁴⁸

In turn, scholar David Schwartz’s *NATO’s Nuclear Dilemmas* adds to the strategic perspective of IRBMs development.⁴⁹ In this historical work on a significant period in US history, he dedicates a chapter to analyzing the deployment of missiles in Europe. Similar to Brown, Schwartz assesses the strategic deployment of IRBMs but additionally describes how the NATO situation shaped the missile conversation. In discussing the competition between the Army and the Air Force, he places significant blame on Secretary Wilson: “Time and again the decision to choose between the two services was postponed” because “Wilson had no stomach for such a difficult choice.”⁵⁰ This is distinct from Brown’s assessment, which heavily analyzes the decisions from President Eisenhower’s perspective.

President Eisenhower allowed his defense secretaries to manage inter-service missile development but prioritized their development and personally approved the DoDs IRBM development plan—albeit begrudgingly. *Foreign Relations of the United States, 1955–1957*, includes 174 vital primary source documents such as NSC meeting transcripts, State Department memorandums, diary entries, and DoD briefs that influenced Eisenhower’s understanding of the strategic situation with the Soviet Union and his decisions regarding IRBMs.⁵¹ Publicly available through the US State Department website, the book provides “an accurate and comprehensive record of basic U.S. national security policy doctrine” during the early part of the Cold War.⁵² Of particular interest for this discussion are the TCP surprise attack brief, the NSC follow-up discussion, and the DoD’s IRBM development plan, as well as notes on essential discussions between the president and the JCS regarding inter-service disagreements and a meeting between Eisenhower and Army Chief of Staff Maxwell Taylor to understand the Army’s Jupiter missile justification.

In addition to official records, President Eisenhower captured crucial moments of his first presidential term in *Mandate for Change, 1953–1956: The White House Years*.⁵³ This firsthand account provided key details for this study, as the president reflects on his decisions regarding IRBM development and prioritization and his reluctant support of Secretary Wilson’s

decisions. Additionally, Eisenhower candidly discusses his relationship with the JCS and the challenges he faced with individual officers. Finally, he explains his strategic thinking, justifying his decisions and reflecting on how he viewed problems within the greater context of the early Cold War.

From an academic perspective, *The Presidency of Dwight D. Eisenhower* by historians Chester Pach and Elmo Richardson provides additional insight on Eisenhower's decisions.⁵⁴ They analyze the nation's shifting perception of Eisenhower over time and present a moderate perception of the president as a leader. Importantly, the authors look at President Eisenhower's leadership style—specifically, his interest in delegating authority and staffing his cabinet with “many individuals with managerial experience in business and finance . . . who he believed could exercise disinterested leadership.”⁵⁵ Their assessment of Eisenhower as a manager provides necessary context for the president's interactions with Secretary Wilson regarding missile development effort duplication. Political scientist Fred Greenstein's *The Hidden-Hand Presidency: Eisenhower as Leader* builds on this point by directly analyzing Eisenhower's leadership style.⁵⁶ Together, these books help explain many of Eisenhower's decisions, particularly in allowing his staff the freedom to make decisions and his hands-off approach to internal DoD decisions.

While most of the literature focuses on the president's role in IRBM development, military historian Richard Leighton's *Strategy, Money, and the New Look: 1953–1956* provides insight into Secretary of Defense Charles Wilson's decision-making process.⁵⁷ Wilson was the most important actor in the Jupiter Missile controversy, and this book analyzes his decision to restrict the Army's missile role on the battlefield. Author Robert Watson adds to this assessment in the fourth JCS history book, *Into the Missile Age: 1956–1960*.⁵⁸ This volume details the growth of surface-to-surface missiles, including the build-up to and reception of controversial range restrictions that Secretary Wilson applied to the Army.

In addition to Eisenhower and Wilson, numerous senior Army officers who were essential to the service's Jupiter pursuit wrote books shortly after retiring. One of the most important was Army Chief of Staff General Maxwell Taylor's 1960 *The Uncertain Trumpet*.⁵⁹ Taylor critiques Eisenhower's New Look strategy and offers numerous solutions to better the military, including the Army's reacquisition of the Jupiter program, and captures some of the challenges that consensus-based organizations face in making decisions regarding contentious issues. He argues that “one of the ‘quick fixes’ which we should adopt at once is a revival of the Jupiter IRBM program,” with “its allocation to the Army as a mobile field weapon.”⁶⁰ Additionally, Taylor provides insight into his time on the JCS,

illuminating several policy development processes. As he explains, the JCS “have all the faults of a committee in settling important controversial matters. They must consider and accommodate many divergent views before action can be taken.”⁶¹

Likewise, Army General James Gavin captures his personal experiences from the missile race in *War and Peace in the Space Age*, which details the rise of missiles and the shifting debate over their application. Interestingly, when discussing the evolution of missiles, he notes that “the political-military dilemma in the late forties slowly evolved into a technological dilemma by the mid-fifties.”⁶² Significant to this study is Gavin’s understanding of the expanding nuclear battlefield. He explains that “due to the range and destructiveness of missiles today, the world has shrunk, in a tactical sense, to a small tactical theater. Most of the NATO region is in the forward area of the front lines.”⁶³ Gavin, who served as the head of Army research and development leading up to the Army’s Jupiter pursuit, provides insight into the Army’s desire to continually extend missile ranges and the service’s assessed requirement for theater-support missiles.

It is important to note that although the research in this project is a synthesis of primary and secondary source documents, the analysis is also shaped by professional and academic experiences. The author’s training and combat experience as a field artillery officer helped shape this assessment of the Army’s need for missiles. This experience includes commanding rocket artillery units and employing precision-guided rockets in combat—a unique background that has driven this scholarly research into artillery training and employing rockets.⁶⁴

Additionally, the author’s previous academic research in innovation and adaptation—including a Naval Postgraduate School in Strategic Studies thesis titled “Lessons Learned and Unlearned: U.S. Field Artillery Since the End of WWII”—provides a lens for assessing the Army’s modernization choices.⁶⁵ This work assessed external drivers of innovation for US indirect-fire capabilities, measuring the impact of technology, combat experience, and external threats on modernization priorities: “Apart from the immediate pressures of active conflict, external threats are the primary driver of adaptation.”⁶⁶ Future assessments of “why” a service modernizes will inherently assume an external threat is the most critical factor. Overall, these professional and academic experiences create a unique perspective from which to analyze the Army’s potential need, or lack thereof, to develop the Jupiter missile. By combining a unique approach to the problem and relevant professional and academic experiences, this study contributes to the already diverse and expansive literature on inter-service competition related to the Army’s development of the Jupiter missile.

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Chapter 2

1947–1952: The Foundation for Missile Development

While this research focuses on missile development during President Dwight Eisenhower’s first term, 1953–1957, the foundation of inter-service missile competition dates back almost a decade earlier. In the five years following the establishment of the Department of Defense (DoD) in 1947, the services continuously updated their defined functions and struggled to delineate responsibility for emerging technology such as missiles. An examination of this five-year period reveals three points which are necessary to understanding the Jupiter missile controversy. First, the initial DoD structure required a consensus-based approach to decision-making, which often led to ambiguous verbiage. Second, service functions naturally overlapped, a structure that was exacerbated by unforeseen technological innovation. Last, while the Joint Chiefs of Staff (JCS) and similar service-based committees attempted to delineate missile-development responsibilities, senior service members could not subordinate their respective service interests. To provide the requisite background information for understanding the Army’s Jupiter missile pursuit, this chapter analyzes the development of service functions and assesses the services’ early attempts to mitigate inter-service missile competition.

Laying the Groundwork for Interservice Competition

On 26 July 1947, President Harry Truman signed into law the 1947 National Security Act, creating the Military Establishment and fundamentally altering the relationship between the services.¹ He was adamant that the post-WWII era’s strategic complexities required a reorganization of the defense establishment to create a unity of effort. Truman was a proponent of service unification, calling for a “unified direction of land, sea, and air forces” in a 1945 special message to Congress.² The president understood that technological advancements had blurred the line between the services’ traditional responsibilities, and continued development would create an inter-service dependency. He noted to Congress that “the boundaries that once separated the Army’s battlefield from the Navy’s battlefield have been virtually erased.”³

Although the National Security Act did not unify the services, it did start the process toward a unified effort. In fact, the changes provided “authoritative coordination and unified direction under civilian control.”⁴ Expanded further, this unified direction included “effective strategic direction of the armed forces and for their operation under unified control and for

their integration into an efficient team of land, naval, and air forces.”⁵ Service unity of effort was a central theme to the new Military Establishment, which was particularly important for the eventual pursuit of missiles—a weapon system that would span traditional land, sea, and air domains.

While the JCS had proved successful in WWII, Truman was not confident that the services could achieve this unity of effort through the JCS alone. In his 1945 message to Congress, he explained that the JCS approach “was better than no coordination at all, but it was in no sense a unified command.”⁶ Additionally, Truman noted that the JCS was “a committee which must depend for its success upon the voluntary cooperation of its member agencies.”⁷ However, he cautioned that as the strategic situation changed, resources became limited, and modernization efforts overlapped, “unanimous agreements will become more difficult to reach.”⁸ This prescient comment calls attention to the underlying problem with inter-service competition and a consensus-based approach to decision-making in a resource-constrained environment. It also foreshadowed problems in DoD’s early years, including the lack of centralized decision-making that exacerbated inter-service missile competition through the 1950s.

The secretary of defense position, created by the 1947 National Security Act, was essential to mitigating inter-service competition. The new position became “the principal assistant to the president in all matters relating to the national security” and responsible to establish programs for the services, provide direction and authority, and—key to this study—to “take appropriate steps to eliminate unnecessary duplication or overlapping” efforts.⁹ However, the secretary of defense’s tasks carried caveats that strengthened the independent services, allowing them to maintain their autonomy and subvert the secretary’s authority.¹⁰ The services would be “administered as individual executive departments by their respective secretaries and all powers and duties relating to such departments not specifically conferred upon the secretary of defense,” would be retained by the service secretaries.¹¹ As a consequence, inter-service competition continued at the executive level, as each service competed for resources and responsibilities as individual departments, not as a single military establishment. John Ponturo—a research analyst at the Institute for Defense Analyses—argues that in its original design, the secretary of defense “was essentially an overall coordinator imposed on powerful and cohesive service departments.”¹² Therefore, while the new position of secretary of defense created service oversight, the services still had to resolve contentious issues through compromise and inclusion.¹³

To reduce potential overlap of service efforts in the post-war era, President Truman codified service functions into law in Executive Order (EO) 9877, a supplementary order to the 1947 National Security Act.¹⁴ These published service functions were the foundation of the armed forces, providing an outline that helped the services shape their training, manning, and equipping priorities. The Army was assigned to prepare forces and develop weapons “for the effective prosecution of war,” emphasizing seizure, defense, and occupation of land areas.¹⁵ The Navy would prepare forces for “operations at sea,” explicitly for the “control of vital sea areas, the protection of vital sea lanes, and the suppression of enemy sea commerce.”¹⁶ The Air Force, designated as the “strategic air force of the United States,” was responsible to train and develop its service to establish “local air superiority where and as required,” and to provide “air support to land forces and naval forces.”¹⁷ Thus, the initial establishment of service functions delineated obvious responsibilities, focusing the Army to land, Air Force to air, and Navy to sea. However, overlap between the initial functions existed, particularly regarding aircraft.

It is notable that Truman’s EO 9877 wording left room for interpretation, particularly for the Air Force and Navy. Truman directed the Navy to coordinate its air aspects with the Air Force regarding basing and aircraft procurement; however, he caveated this guidance, noting that this coordination was only required when economical and efficient.¹⁸ Truman went on to indicate “the Navy will not be restricted as to types of aircraft maintained and operated” to accomplish its functions.¹⁹ Given this imprecise wording, the services had to interpret the president’s intent. Air Force staff historian Richard Wolf flags this point, noting that EO 9877 “set the stage for some conflicts over roles and missions between the Navy and the Air Force, each of which interpreted conflicting guidance to best suit its own purposes.”²⁰ Before technological innovations such as missile technology brought clarity issues with service functions to the forefront, there was a natural overlap of responsibilities. Not surprisingly, less than a year after Truman officially codified service functions, the services assembled to adapt and clarify them.

Clarifying Service Functions at Key West and Newport

In January 1948, inter-service conflict arose over service functions to the point where outgoing Chief of Naval Operations Admiral Chester Nimitz publicly expressed his concern regarding the Navy’s strategic air role. He singled out the Air Force’s reliance on forward-basing, arguing that aircraft carriers provided a unique strategic capability of a mobile

“airfield” that allowed the Navy to project air power globally.²¹ Though aircraft had proved a natural overlap between the services, technology was just the means to an end. The underlying issue was the strategic mission, which carried a large slice of the shrinking DoD budget, and ultimately meant more money in an increasingly austere time. Missiles would eventually exacerbate these underlying issues, requiring specific development and employment guidance to avoid redundancies.

To address confusion regarding service functions, Secretary of Defense James Forrestal worked directly with the service secretaries and the JCS to redraft EO 9877.²² Historian Steven Rearden explains that after President Truman established functions, the services still needed to resolve “differences over roles and missions, division of available funds, kinds of military forces needed and their management, and, of course, the kind of organization required to deal with these problems.”²³ During this time, the future of warfare, and the services’ respective role in it, was unclear: the major issue was how much each service would cooperate versus operate independently with its own respective air, land, and sea forces.²⁴ Air Force Chief of Staff General Carl Spaatz and Army Chief of Staff General Omar Bradley expressed their aversion to operation duplication, arguing for integrating each service’s respective capabilities. On the other hand, Chief of Naval Operations Admiral William Fichteler maintained a similar argument to that of Nimitz, contending that the Navy had a unique mission and its ability to project power via land, air, and sea should not be restricted.²⁵

In addition to generally limiting Navy air capabilities, Spaatz argued that the Air Force should oversee Navy aviation units because it had the primary air mission.²⁶ Bradley and Fichteler disagreed with this “veto power” regarding capability development.²⁷ In March 1948, after continual conflict across the services regarding these problems, Forrestal gathered the Joint chiefs at a conference in Key West, Florida, with the goal of resolving service function disputes.

Under the guidance of Secretary of Defense Forrestal, the services reached an agreement on service functions. Shortly after, President Truman revoked EO 9877, and Forrestal signed the “Functions of the Armed Forces and the Joint Chiefs of Staff” policy, colloquially known as the Key West Agreement. In general, the service functions were clarified as opposed to altered. Forrestal resolved the strategic air dispute between the Navy and Air Force by delineating the Air Force’s primary function as “responsible for strategic air warfare.”²⁸ However, the Navy was not excluded from air operations. In fact, one of the approved Navy missions

entailed a naval air component to “conduct air operations as necessary for the accomplishment of objectives in a naval campaign.”²⁹ While this distinction seems straightforward, it was vague enough to perpetuate interpretation regarding equipment modernization. Author George Watson explains that under these more defined roles, “the Navy was not prohibited from attacking any targets, inland or otherwise, to accomplish its mission.”³⁰ The new service function language allowed the Navy to interpret its requirements broadly.

Significantly, Forrestal also assigned the services “collateral functions” to help address mission overlap and promote service cooperation. He defined collateral function as providing forces to “support and supplement the other services in carrying out their primary functions, where and whenever such participation will result in increased effectiveness and will contribute to the accomplishment of the overall military objectives.”³¹ In this way, the Navy was to “be prepared to participate in the overall air effort,” and “to conduct close air support for land operations.”³² Similarly, Forrestal assigned the Air Force the collateral function “to interdict enemy sea power through air operations,” and “to conduct antisubmarine warfare.”³³ Inadvertently in his attempt to clarify, Forrestal created responsibility overlap that allowed the services to interpret intent. Historian Robert Watson similarly argues: “[The] Key West Agreement, at least as it was applied in practice . . . seemed to allow opportunity for the services to multiply their tasks for their own aggrandizement, in disregard of the principle of unification.”³⁴ In essence, while the agreement resolved certain disputes, the solutions were laced with ambiguity.

Essentially, the agreement’s potentially broad application could be misinterpreted, allowing unnecessary effort duplication. While the “joint” mindset created through the collateral functions had value, the services could easily abuse the permissive policy. Although Nimitz provided a sound argument for the Navy’s operational aircraft requirements, his reasoning did not warrant an entirely separate Air Force. Historian Kenneth Condit notes that Forrestal addressed this specific point:

The Navy would retain its air power . . . and would be responsible for determining the means required to carry out naval missions. But this authority could not be used to justify creation of a naval strategic air force.³⁵

Given this situation, clarity was a significant challenge in developing service functions; being overly restrictive or too vague could create problems. As technology changed and the US strategy evolved, resolving this

dilemma required a continual reassessment of service functions. In sum, opportunity cost and overlapping service functions became the underlying themes of the eventual inter-service missile competition.

While Secretary Forrestal made progress with the Key West Conference, evolving technology and an unclear strategy left the services in competition. Historian Steven Rearden emphasizes this point: “Until the actual cooperation matched the resourcefulness of the semantic compromises, there could be no genuine harmony or teamwork, and no true resolution of the more troublesome roles and mission questions.”³⁶ Although the Key West Conference was a landmark success, the chiefs reassembled a few months later to reassess unresolved contention points. At the forefront of these issues was control of and influence over nuclear weapons.

Nuclear weapon development had the potential to become a controversial inter-service issue because of the weapon’s strategic implications and the associated funding; therefore, the atomic warfare issue lingered after the Key West Conference. Rearden explains that there was a general understanding by the services that “atomic weapons would play a central role in war planning, that atomic forces would receive high priority, and that the division of funds among the services would be greatly affected by this priority.”³⁷ At the time, however, the Air Force was the only service with a nuclear weapon delivery capability and was in the process of rapidly expanding its atomic bomber fleet from 30 aircraft to 200.³⁸

Given the combination of delivery capabilities and the strategic air function assignment, the Air Force chief at the time, General Spaatz, logically concluded that his service should be the US military’s primary nuclear force; the Navy vehemently disagreed. Before he retired, Spaatz openly fought for the Air Force to have exclusive control of all nuclear weapons.³⁹ The other service chiefs adamantly rebuked this claim. In particular, the Navy fought the Air Force’s assertion, arguing that a single service should not have control over atomic weapons.⁴⁰ According to Rearden, the other services believed the Air Force tended “to think of atomic and strategic bombing as one and the same.”⁴¹ Therefore, the Air Force could interpret its assigned function’s vagueness and would continue to fight for dominance in the nuclear arena. This general Air Force attitude regarding nuclear weapons contributed to the service’s eventual apprehension toward Army and Navy missile pursuits.

Secretary Forrestal, discouraged by the JCS’s inability to resolve their issues, enlisted two retired officers—General Spaatz and Admiral John Towers—to help assess the Navy’s and Air Force’s nuclear warfare requirements.⁴² Spaatz and Towers agreed that the Key West document

was satisfactory. However, the two “conceded that varying interpretations were possible,” arguing that their respective service should control nuclear weapons.⁴³ Despite this progress, Forrestal reassembled the JCS to amend service functions and clarify any remaining unclear terms—just six months after the Key West Conference.

At this second conference, held at the Naval War College in Newport, Rhode Island, Forrestal worked to alleviate any concerns regarding the Air Force’s attempt to control the future of nuclear weapons. To quell the Navy’s fear that the Air Force would monopolize atomic capabilities, the chiefs agreed to alter the meaning of “primary mission” as it related to service functions: “The exclusive responsibility and authority in a given field do not imply preclusive participation.”⁴⁴ This verbiage implied that each service could pursue any capability that was deemed necessary for its mission. Beyond opening the door to other services, the adjusted definition required the assigned service to “take into account the contributions which may be made by forces from other services.”⁴⁵ This inclusive language, which theoretically promoted teamwork and a unity of effort, ultimately led to redundancy and waste in a resource-constrained competitive environment.

By choosing to ensure no service was left out of the nuclear arena, Forrestal left wide room for interpretation and allowed all services to assess their modernization needs through a nuclear lens. Importantly, missile technology advancements in the years following this conference created new nuclear delivery systems that allowed all the services to incorporate nuclear weapons into their respective warfighting doctrine. While not articulated by Army leadership, the permissive definition of primary mission established at the Newport Conference allowed the service to develop missiles that duplicated the Air Force’s interdiction mission. In contrast, Air Force leaders—including Chiefs of Staff General Hoyt Vandenberg and General Nathan Twining, as well as Secretary of the Air Force Donald Quarles—generally ignored this definition and argued against Army missile projects, given service function overlap. Over the following years, missile technology developments and a reduced budget exacerbated these tenuous inter-service relationships.

The Strategic Rise of Missiles

Although missiles were an emerging technology in the late 1940s, their military potential had been apparent since WWII; in addition, missile development was not always contentious. In April 1946, according to historian Jacob Neufeld, the Army and Navy “issued a joint statement supporting a comprehensive national guided missile program, including

joint procurement, testing, and training.”⁴⁶ However, the national missile program did not come to fruition. In the years that followed, the services struggled to delineate missile-development responsibilities in order to avoid effort duplication and service function overlap.

In 1947, Vannevar Bush, the director of the Research and Development Board, established the Guided Missile Committee (GMC) as one of the first organizations to manage missile development. Bush assigned the organization to be “responsible for the preparation of an integrated national program of research and development in the field of guided missiles and for coordination of the work of the three military departments to this end.”⁴⁷ As already discussed, however, inter-service competition and service function ambiguity were prevalent in this period. Author Elliot Converse comments that the GMC’s effectiveness was “unquestionably hamstrung by contests between the services.”⁴⁸ In particular, the Army demanded that its members present the “policy line” on contentious issues.⁴⁹ Converse expands on this concept, writing that the Army “made a considerable effort to ensure that its officers and civilians serving . . . on its committees and panels knew exactly the position to take on matters that came before them.”⁵⁰ This was not unexpected as, first and foremost, committee members were representatives of their respective service; by not empowering its representatives to deviate from the service narrative, however, committees and panels were combative rather than collaborative. This raised and continues to raise questions about the efficacy of joint-level organizations to elevate military priorities over the individual interests of services. Significantly, this challenge to subordinate service interests perpetuated over the next decade.

In addition, GMC members did not accomplish the organization’s mission. The senior Air Force officer on the Research and Development Board—General Joseph McNarney—echoed this sentiment in a 1948 organizational assessment for Secretary of Defense Forrestal that “pointed to the total of thirty-five different guided missiles of all types being developed by the services and the failure of the board’s committees to confront such apparent duplication as” a significant hindrance to a unified development plan.⁵¹ This lack of action was exacerbated by the fact that committee members filled their role as additional part-time duties: “on average, committees and panels met only five days a year.”⁵² While the GMC did not directly impact the Army’s pursuit of the Jupiter missile, it set a precedent for an internal missile development focus over joint or complementary modernization efforts. By the end of the 1940s, missiles grew in strategic importance as resistance to the assumptions regarding an air offensive against the Soviet Union began to emerge.

In April 1949, President Truman engaged the Joint staff, and newly appointed Secretary of Defense Louis Johnson, regarding the feasibility of an offensive air operation against the Soviet Union.⁵³ The JCS subsequently directed its new research organization, the Weapons Systems Evaluation Group (WSEG), to undertake this research endeavor. Secretary Forrestal had activated the WSEG in December 1948 and outlined its mission:

The purpose of the Group is to provide rigorous, unprejudiced, and independent analyses and evaluations of present and future weapons systems under probable future combat conditions—prepared by the ablest professional minds, military and civilian, and the most advanced analytical methods that can be brought to bear.⁵⁴

The decision to include “unprejudiced” and “independent” is significant—acknowledging challenges with subordinating service interests and potential inter-service competition related to analyzing developing technology. The WSEG briefed Secretary Johnson and Truman in January 1950 on its conclusions regarding the air offensive against the Soviet Union, then a month later published its findings in “WSEG Report Number 1: Report on Evaluation of Effectiveness of Strategic Air Operations.”⁵⁵

The JCS did not officially endorse the WSEG’s findings but did acknowledge their importance for planning purposes; however, the JCS recommended to the president that the report not be made public.⁵⁶ This lack of support is likely because the WSEG report did not offer favorable conclusions regarding the potential air bombardment of the Soviet Union. Ponturo describes the report as “generally pessimistic as to the probability that offensive strategic air operations could be carried out on the scale called for in existing emergency war plans” and notes that it highlighted numerous logistical constraints, such as aerial refueling and reliance on forward-basing.⁵⁷ Indeed, the report validated many Navy concerns outlined by Admiral Nimitz years prior. However, Rearden argues that “while it weakened many of the claims made by the Air Force, the WSEG study failed to confirm the Navy’s basic contention that strategic bombing was highly overrated and unreliable.”⁵⁸

More devastating than the logistics issues were WSEG findings regarding the military’s inability to identify and address Soviet anti-air capabilities.⁵⁹ Rearden explains: “[The] WSEG calculated a bomber attrition rate of 30 to 50 percent.”⁶⁰ This realization elevated the importance of missiles as an alternate nuclear delivery platform. In this context, if there was competition regarding nuclear weapons control, the delivery method now influenced the decision. In other words, competition over nuclear pri-

macy was now expressed in competition over delivery means, which was potentially an existential concern for the Air Force. Converse notes: “By the end of the decade, the missile was beginning to compete with the airplane in strategic importance.”⁶¹ The services no longer viewed aircraft as the sole military answer to the Soviet problem and, as technology evolved, instead pivoted to diversifying their ability to deliver nuclear weapons. In turn, less than two months after the WSEG published its findings, the JCS briefed Secretary of Defense Johnson on the proposed delineation of missile-development responsibilities.⁶²

Establishing Guided-Missile Responsibilities

As 1950 approached, the JCS presented a joint recommendation to Johnson regarding how to assign responsibilities for guided missiles.⁶³ Johnson, frustrated with the inter-service missile competition, directed the Air Force to review current missile projects across the services before approving the JCS memorandum.⁶⁴ By ordering this review, he acknowledged the potential capability overlap and appreciation of related problems. Johnson contended that “although more than one service might demonstrate a legitimate requirement for a missile, it was not necessary for all the services to develop that missile.”⁶⁵ This statement from Neufeld’s book is fundamental for understanding the missile competition and, in a broader context, emerging technology management. Over the next few years, Army leadership regularly promoted the importance of long-range missiles with continually adjusted range requirements but often failed to justify why the Army should be responsible for the new weapon’s employment—even though missiles became essential to the Army’s vision of the future battlefield. This was particularly true as the ranges extended from under 100 miles to more than 1,000.

Following Johnson’s guidance, Secretary of the Air Force Stuart Symington formed the Special Interdepartmental Guided Missiles Board (SIGMB) to review current projects and create a joint missile program.⁶⁶ However, inter-service competition limited the SIGMB as soon as the organization began its task, and Symington could not subordinate his individual service interests to provide an unbiased assessment to Johnson. Neufeld calls attention to the SIGMB’s ineffectiveness, noting that the organization’s eventually completed report “was a complex document containing long lists of disagreements.”⁶⁷ He adds that “the Air Force charged that the Army and Navy were illegally developing surface-to-surface missiles with ranges beyond 500 miles,” which Symington claimed the Air Force should own because the “missiles belonged in the strategic

class.”⁶⁸ Markedly, Symington was using range to determine service function; however, as previously discussed, the Navy was not precluded from developing such munitions. Additionally, Forrestal directed in the Key West Agreement that the Army had “primary interest in all operations on land” and was responsible “to defeat enemy land forces.”⁶⁹ Symington’s assertion obviously was grounded in his specific interpretation of assigned service functions.

The review of active missile projects, and Symington’s position on service function encroachment, emphasized the importance of clarity between the services regarding missions. Because the emerging technology was immature, missile use complicated service function interpretations. However, because missiles are tools for achieving a multitude of missions, defining development priorities was a requirement for mitigating unnecessary effort duplication.

Ultimately, Johnson did not follow the SIGMB recommendations and eventually approved the JCS missile-responsibilities proposal. The chiefs agreed it did not make sense to assign “responsibilities for the entire guided missile field” to a single service.⁷⁰ In the proposal, the JCS declared missiles would “be employed by the Services in the manner and to the extent required to accomplish their assigned functions.”⁷¹ This wording left ample room for interpretation, and was reminiscent of the verbiage in the initial adaptations of service functions at the Key West and Newport conferences a few years prior. In this way, the services could frame any missile modernization objective through the lens of their broadly defined roles and missions.

By approving the joint memorandum, Johnson categorized the new weapons as air-to-air, surface-to-air, and—the most pertinent to this research—surface-to-surface.⁷² The JCS proposal divided missile-development responsibilities between the services based on the capabilities that the new weapon extended. The Air Force would direct “surface-launched guided missiles which supplement, extend the capabilities of, or replace Air Force aircraft (other than support aircraft).”⁷³ In contrast, the Army gained responsibility for “surface-launched guided missiles which supplement, extend the capabilities of, or replace the fire of artillery.”⁷⁴ Additionally, the two shared responsibility for missiles that would “supplement, extend the capabilities of, or replace support aircraft.”⁷⁵ Significantly, establishing an overlapping responsibility created inter-service competition and influenced missile development from the onset.

Although this division of effort may have seemed clear when written, services could easily misinterpret it—intentionally or unintentional-

ly—because a missile was neither an airplane nor artillery. Former US ambassador Michael Armacost furthers this point by noting that “the guided missile was not a direct derivative of either the airplane or of field artillery . . . it had the characteristics of both.”⁷⁶ He explains that the unique nature of guided missiles at the time, and the potential rapid technological advancements they promised, “implied no obvious jurisdictional assignment.”⁷⁷ However, since the JCS ignored previously presented concrete definitions based on range, and instead divided missile types using abstract terms regarding usage intent, the wording left room for interpretation and potential disagreements. Symington, in particular, used range as a means of categorizing a missile’s function. In contrast, by not addressing range issues, Johnson exacerbated inter-service missile competition. In fact, just three years after the 1950 missile agreement, the Army’s pursuit of a missile with a 500-mile range sparked a significant inter-service dispute. This issue is assessed in Chapter 3 through a case-study analysis of the Regulus missile controversy.

As Secretary Johnson did not explicitly outline restrictions, the services could take advantage of ambiguity, focus solely on their respective priorities, and apply favorable meanings to their assigned missile responsibility. This was in stark opposition to the unity of effort for which senior leaders such as President Truman and Secretary of Defense Forrestal had been fighting. Armacost notes that “the services considered their primary and overriding mission to be the destruction and defeat of their enemy counterparts. This stimulated service hopes for self-sufficiency in weapons.”⁷⁸

Because Johnson did not clearly define missile types, the Army could develop missiles with any range capability if the service could justify their use. This idea is examined further in Chapter 3 via an analysis of the Army’s missile requirements on its perceived future battlefield. Overall, the 1950 missile agreement did little to delineate development responsibility, allowing the services to pursue missile development with almost no restrictions. Indeed, the debate regarding missile ranges as the determining factor continued in subsequent years. For example, in 1951, US Air Force Chief of Staff General Hoyt Vandenberg recommended range restrictions on Army missiles; he proposed that the “Army be restricted to surface-to-surface missiles to be used within the combat zone of opposing armies, which he defined as within fifty to seventy-five miles on both sides of the line of contact.”⁷⁹ The Air Force continued to pursue similar range restrictions over the following years, and this argument eventually proved fundamental to Secretary of Defense Charles Wilson’s 1956 decision regarding the Jupiter missile.

Conclusion

The decisions and agreements from 1947 to 1952 set the conditions for the inter-service missile competition. While these agreements clarified service functions, the consensus-based approach and inclusive language created ambiguity, allowing the services to interpret the DoD guidance to suit their own needs. Additionally, the codification of these functions illuminated a natural overlap between the services, an overlap that was exacerbated by emerging technology. While the JCS and similar service-based organizations attempted to mitigate effort duplication through missile development restrictions, these attempts underscore that service representatives cannot subordinate their service interests for the betterment of the DoD. The vague missile-development responsibilities outlined by the JCS in its 1950 missile agreement fostered effort duplication by categorizing missiles as extensions or replacements of artillery or aircraft. Because each service could loosely apply missiles to their assigned functions, and DoD policies emphasized inclusion, the services competed for resources in a shrinking budget.

Just as technology advanced enough for missile projects to transition from concepts to actual equipment on the battlefield, a new administration took office, adding a new dynamic to the inter-service missile competition. In turn, competition spiked in President Dwight Eisenhower's fiscally conservative first term. The following chapters analyze the Army's missile requirements and the inter-service missile competition from 1953 to 1956 to understand the Army's pursuit of the Jupiter missile and Secretary of Defense Charles Wilson's 1956 decision to clarify service functions.

Notes

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10. The President of the United States of America, 70.

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12. John Ponturo, “Analytical Support for the Joint Chiefs of Staff: The WSEG Experience, 1948–1976,” IDA Study S-507 (Institute for Defense Analyses: International and Social Studies Division: Arlington, VA, July 1979), 7, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a090946.pdf>.

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19. The President of the United States of America, 89.
20. Richard Wolf, *The United States Air Force: Basic Documents on Roles and Missions* (Washington, DC: Office of Air Force History, United States Air Force, 1987), 85, <https://media.defense.gov/2010/May/25/2001330272/-1/-1/0/AFD-100525-080.pdf>.
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Chapter 3

1953–1954: The Inter-Service Missile Competition

While intermediate-range ballistic missile (IRBM) development did not become a contentious topic until 1955, decisions regarding missile responsibilities and service functions from 1953–54 set the conditions for the eventual inter-service IRBM race. An examination of the decisions in this two-year period illuminates three essential factors to help understand the Army's Jupiter missile pursuit. First, the Army established its operational need for missiles in 1950, well before the New Look concept, although this strategic shift exacerbated Army pursuits. However, while the Army's justified missile-support requirements created tension with the Air Force, the most significant foreseeable requirement did not exceed 750 miles—half the range of the Army's eventual 1955 Jupiter missile proposal. Second, Secretary of Defense Charles Wilson did not address missile responsibilities in his 1954 directive, deliberately avoiding controversial issues such as the Army's 1953 attempted Regulus missile purchase. Last, the Joint Chiefs of Staff (JCS) used ambiguous wording in the 1954 missile-responsibility agreement, which points to a continual problem that service representatives had subordinating their service interests to resolve contentious issues. This chapter assesses the Army's identified missile requirements then analyzes the Regulus missile controversy regarding the development of the 1954 adaptations to service functions. The chapter concludes with an examination of the rising Soviet threat and the creation of the Technological Capabilities Panel (TCP).

Army Missiles and the Nuclear Battlefield

Although the Army's missile pursuits predate President Dwight Eisenhower taking office, the president's emphasis on nuclear weapons in the New Look strategy intensified the Army's modernization efforts. In its now-declassified top-secret NSC 162/2 document, the National Security Council (NSC) normalized the use of nuclear weapons, stating clearly that "in the event of hostilities, the United States will consider nuclear weapons to be as available for use as other munitions."¹ Additionally, the NSC reinforced that "every effort should be made to eliminate waste, duplication, and unnecessary overhead in the Federal Government."² As this became essential for inter-service missile competition, Secretary Wilson faced the challenges of delineating missile responsibilities and adjudicating service squabbles regarding overlapping capabilities. Hence, the development of

nuclear weapons created an avenue for the services to vie for their share of a dwindling budget. Simultaneously, the report alluded to air offensive limitations and the importance of diverse delivery capabilities, indirectly elevating the importance of missile development. Former US ambassador Michael Armacost explains: “The major new technology was guided missile delivery systems,” and “the service which mastered the most advanced technologies could expect corresponding reward when funds were distributed.”³ For the Army, which was finally beginning to field missiles to combat units, this strategic shift provided a reason to adapt the service for nuclear warfare. Brian Linn, a Texas A&M history professor, indicated that “whether intended or not,” the New Look “provided a justification for the army’s vision of the tactical atomic battlefield.”⁴

Given this transition away from massive conventional forces, the Army’s role on the future battlefield was unclear. Armacost notes: “While the organizational survival of the Army was scarcely threatened, its future status was obviously jeopardized” under the New Look strategy.⁵ Linn explains three challenges for Army nuclear proponents working to transform the Army for a new type of warfare:

The first was to prove the army was still relevant in the Cold War. The second problem was how to transform the army’s existing doctrine, organization, equipment, and personnel to fight on the atomic battlefield. The last problem was how to reverse the army’s decline in prestige and funding, win public and political support, inspire those who wore its uniform, and restore the service’s preeminent role in national defense.⁶

In short, missiles became a significant component for solving these problems. While Army leadership remained divided on the role of nuclear weapons for a future conflict, the service adapted to the nuclear battlefield.

General James Gavin—the 1954 Army assistant chief of staff for plans and operations—was one of the Army’s most senior nuclear proponents, arguing that nuclear weapons had fundamentally transformed ground warfare.⁷ According to Linn, Gavin believed “the very threat of nuclear attack eliminated the enormous supply depots, massed armor columns, and huge troop concentrations that had characterized modern warfare: mobility, shock, and dispersion would be the essential characteristics of the atomic battlefield.”⁸ For these reasons, missiles—the Army’s primary means of nuclear delivery—were a necessity. Gavin argued that the depth of battlefield had grown ten-fold: “If our fire power was to have adequate range,” then there was an operational “need for the replacement of conventional artillery with missiles.”⁹ For leaders like Gavin, missiles

were an operational requirement which provided extended range and destructive capacity to support the Army's envisioned future battlefield.

Notably, the nuclear battlefield required the Army to adjust its operations doctrine. Walter Kretchik, a Western Illinois history professor, comments on this transition: "The Army was not obsolete, it simply had to adapt to the challenges of modern warfare . . . devising a tactical scheme for its forces not only to survive a nuclear attack, but to fight one offensively using nuclear weapons."¹⁰ While nuclear weapons required a dramatic doctrinal shift for the Army, land forces still served a significant role in any future conflict. Kretchik summarizes the way the Army's maneuver warfare fit into the nuclear battlefield:

Army combat units would lay hidden until the decisive moment, poised to rush forward in columns once the nuclear fires created holes within the enemy positions. The shock of instant nuclear eradication was expected to instill terror within the now-fleeing enemy survivors. American mechanized forces would then drive through the breach, mopping up pockets of resistance and pursuing the fractured enemy to the point of annihilation.¹¹

However, to avoid catastrophic losses under this new type of warfare, the Army had to increase dispersion of its ground units. Historian Andrew Bacevich focuses on secondary effects, explaining that "the area encompassing such operations necessarily would be much greater than equivalent forces had occupied in earlier wars."¹² In short, the nuclear battlefield forced the Army to fight on a deeper scale than previously, which required extended artillery ranges and created logistical challenges. According to Armacost, General Gavin emphasized this aspect of the nuclear battlefield, anticipating "a battlefield of great depth; a war of dynamic tempo; and the need for weapons of unprecedented range, accuracy, and firepower."¹³

In addition to justifying the Army's role on the future battlefield, missiles enabled the service to maintain tactical independence from the Air Force. Bacevich explains that missiles allowed the Army to "strike targets deep in an enemy's rear, a capability that nothing—not darkness, nor weather, nor enemy defenses—could stop."¹⁴ This is significant because at the time, the services were reluctant to work together. Historian Kenneth Condit sheds light on this aversion: "There was an understandable disinclination on the part of any Service to rely on the others for support, leading to efforts to possess, or at least control, as many as possible of the weapons and forces needed to discharge assigned missions."¹⁵ While missiles provided clear advantages for the Army, they also created a tactical burden.

Because missile technology was immature, many of the Army's missile systems were large and had limited mobility. In turn, missiles were vulnerable to enemy counterfire and dismounted forces—a deadly problem that cannon artillery units experienced in the Korean War.¹⁶ Generally, there is an inverse relationship between range and mobility regarding artillery employment; the closer an artillery piece is to enemy forces, the more soldiers must move the weapon to avoid its destruction. In contrast, the farther the weapon can fire projectiles, the less the unit is required to move it. Additionally, artillery units are in a continuous battle with enemy artillery units—indirect fire is an offensive capability best suited to destroy, and be destroyed by, other indirect fire assets. As follows, as enemy artillery ranges increase, so must friendly artillery capabilities. Armacost explains: “Extensions in range of artillery support weapons was simply a response to deeper enemy tactical targets and the need to deploy from less vulnerable rear positions.”¹⁷ Therefore, according to developing Army doctrine and the Army's vision of the future battlefield under New Look, missiles that extended the range of conventional artillery were essential.

For missile development specifically, the Army took a three-pronged approach in creating weapons for varying missions; the development plan was based on its assessed service needs with minimal DoD restrictions. In the 1950 missile agreement, the JCS had agreed that the Army's missiles would supplement or replace artillery, allowing the service to interpret its future artillery requirements broadly.¹⁸ As a result, the Army created three missile categories based on varying support priorities, with corresponding ranges: 5 to 35 miles for corps support, 20 to 150 miles for army support, and 150 to 750 miles for theater support.¹⁹ Army doctrine eventually captured this delineation in missile type with only slight adjustments, categorizing the Army's missiles as short-, medium-, and long-range (see Appendix A for pre-Jupiter Army missiles in each of these categories).

The potential for capability and equipment overlap between the Army and the Air Force increased as missile technology progressed. Significantly, the Army's identified theater support requirement, out to 750 miles—a range it had yet to achieve—potentially encroached on the Air Force's interdiction mission. As Bacevich describes, “The Army used such an expansive concept of the tactical battlefield as to collide with cherished Air Force prerogatives.”²⁰ However, before the Army began developing a new theater-support missile after its first attempt had minimal success, the service requested to purchase a 500-mile-capable missile from the Navy. This action triggered an inter-service missile competition—calling attention to problems with the 1950 missile-responsibility memorandum.

The Regulus Missile Controversy

Overall missile development was not inherently contentious between the services; however, as technological advancements fostered increasingly complex missile programs, the distinction regarding the intended use of these weapons began to blur. Author Robert Watson notes that early “projects were readily separable by function, but as the state of the art advanced and the range and maneuverability of missiles increased, it became harder to disentangle functional responsibilities.”²¹ Essentially, as the Army began pursuing more complex missiles, the Air Force contended that the Army was infringing on its service functions.

Inter-service missile competition between the Army and the Air Force spiked in January 1953, when the Army requested DoD permission to purchase the Navy’s Regulus missile. Markedly, at the time, all three services were developing surface-to-surface missiles with comparable ranges—the Army Redstone, the Navy Regulus, and the Air Force Matador.²² The Regulus was a surface-to-surface missile with a 500-mile maximum range, providing the Army an interim capability until it finished developing its Redstone theater-support missile. Secretary of Defense Wilson initially kept the matter at the JCS level so the services could internally resolve the issue.

The JCS members had differing opinions on the Army’s Regulus missile purchase. Chief of Staff of the Army Joseph Collins and Chief of Naval Operations Admiral William Fichteler approved the purchase, while Air Force Chief of Staff General Hoyt Vandenberg opposed it.²³ Collins supported the Army’s request, explaining to the group, according to Watson, that the service “must have missiles under its own control in order to accomplish its mission,” and that “experience with Regulus would provide a basis for evaluating similar missiles under development and perhaps for eliminating some.”²⁴ Air Force representatives were not convinced. According to Watson, Vandenberg “asserted that Regulus, with a maximum range of 500 miles, could in no sense be regarded as an extension of artillery.”²⁵ Air Force leaders argued the Army did not meet the JCS’s intent embodied in the 1950s responsibilities memorandum. Despite this, the potential for inter-service project sharing was expressly considered and documented in the original memorandum; the Air Force argument further highlighted problems with the agreement’s verbiage.

In crafting the initial proposal delineating missile responsibilities, the JCS foresaw anticipated project sharing along with potential effort duplication. In fact, the inclusive language the chiefs chose provided tools for the Army to request access to Navy missile projects. The 1950s

guided-responsibility memorandum indicated: “New weapons developed by the programs of the several Services will be considered available for employment by any Service which requires them in the discharge of its assigned functions.”²⁶ The chiefs also directed each service to determine—pending JCS approval—whether it would require access to developing weapons.²⁷ After assessing the need for theater-support missiles, the Army was justified in its request to access the Regulus missile. Additionally, the chiefs instructed the developing service to share its growing technological knowledge, which likely mitigated effort duplication. The memorandum charges that the service “with primary responsibility for development of a weapon shall invite the participation of any other Service having an operational interest in the weapon.”²⁸ Regarding the Regulus missile, the 1950 missile-responsibilities agreement supported Army and Navy cooperation; however, the Air Force contended the Army was misinterpreting the language of its assigned missile responsibilities.

While the JCS designed the 1950 missile-responsibility memorandum around the services’ assigned functions, the broad and loose language did not account for details such as range or target type. The Army gained the responsibility to develop missiles to “supplement or extend the capabilities of, or replace the fire of artillery.”²⁹ However, the memorandum did not specify or even address to what extent the Army could “extend” its artillery. While the Air Force could express concern over the Army’s development or purchase of a missile with a 500-mile range, the Air Force was not qualified to assess artillery’s role on the battlefield. The Army’s primary function was to “organize, train, and equip” for “combat operations on land” to “defeat enemy land forces.”³⁰ As previously discussed, the Army was the land-warfare service and, as a result, made its strategic assessment regarding indirect-fire needs in a future conflict and determined a service requirement for theater-support missiles.³¹ As described, the Army’s pursuit of a 500-mile range missile, whether its own or the Navy’s, was justified. While the Air Force may have been frustrated with the situation and could make similar justifications for its respective missile project, the combination of vague wording and an emphasis on inclusion in the original missile-responsibility memorandum enabled the Regulus conversation. The problem for the Air Force was not the Regulus missile or any individual missile the Army was developing; its issue instead was the 1950 missile-responsibility agreement. In turn, the JCS could not reach a consensus on the Regulus purchase, and the matter reverted to the DoD.

Instead of deciding on the Regulus missile, Secretary of Defense Wilson transferred the problem to his department’s director of guided mis-

siles, Kaufman Keller. Regarding this decision, historian Jacob Neufeld argues that the Air Force was critical of the Guided Missiles Office and not hopeful of a favorable resolution because of Keller's "close association with the Army Ordnance Department."³² Additionally, because Keller only served in his position part-time, his deputy, Army General Kenneth Nichols, maintained influence over the organization.³³ Notably, Nichols was the Army's director of guided missiles and, as the service representative on several inter-service committees, was incredibly experienced with nuclear weapons and the controversies regarding delineating guided-missile responsibilities.³⁴

Although Keller addressed the Regulus missile controversy, he avoided the problems regarding service responsibilities. In June 1953, Keller denied the Army's request to purchase the missile, primarily because it was still in the development phase.³⁵ According to author Elliot Converse, Keller "thought the Army could learn as much as it needed about Regulus by observing the Navy program."³⁶ Nonetheless, Keller's decision left the situation open to reevaluation when the Regulus was complete.³⁷ Consequently, although the Regulus controversy was resolved, missile responsibility remained open to interpretation.

In considering these factors, the underlying problem regarding the Army's purchase of the Regulus missile arguably was not individual Army capabilities and their development, but the policy that facilitated them. The Regulus controversy was the first significant contentious application of the 1950 missile-responsibility memorandum and provided an opportunity for the DoD to clarify intent and establish a precedent. Instead, Keller's decision, supported by Secretary Wilson, sidestepped the issue. Converse notes: "In avoiding the roles and missions controversy surrounding missiles, Keller joined a large group of senior defense officials who for years had been either unwilling or unable to resolve the issue."³⁸ Unfortunately, service function issues did not end after the Regulus missile controversy. In fact, the Regulus debate foreshadowed a similar argument between the Army and the Air Force three years later that resulted in the Jupiter missile controversy.

Following successful development of the service missile programs, Keller recommended that Secretary Wilson dissolve the Guided Missile Office; the Regulus decision was one of its terminal actions.³⁹ Watson describes the importance of this decision: "The position was abolished on 12 November 1953, as part of a reorganization in which authority to approve missile programs was delegated to the secretaries of the military departments."⁴⁰ Nevertheless, as the Regulus missile controversy demon-

strated, the 1950 JCS missile agreement was too equivocal; to mitigate inter-service missile competition, the JCS would need to readdress its missile-development agreement.

Clarifying Service Functions, Guided Missile Responsibilities

In June 1953, after the Regulus Missile Controversy, the JCS reopened the conversation on missile responsibilities. For surface-to-surface missiles specifically, the primary tension was between the Army and the Air Force, and the respective service chiefs expressed their opinions on drafting a new agreement. Arguing on behalf of the Army, General Collins emphasized that missiles were fundamental for achieving the Army's primary functions, quoting both the 1947 National Security Act and the Key West Agreement.⁴¹ For the Army, he noted, missiles were essential for "conduct of prompt and sustained combat operations on land," and to specifically "defeat enemy land forces."⁴² Collins indicated that "future battlefields . . . would be poorly defined and would embrace targets many miles behind the enemy's rear; hence the range of Army missiles could not be arbitrarily restricted."⁴³ While this reasoning supports the need for long-range missiles, it did not demonstrate why the Army, and not the Air Force, should be the service developing and operating said missiles.

General Nathan Twining, the new Air Force chief of staff, presented the Air Force's opinions on the matter. Twining proposed that the Army could develop surface-to-surface missiles, but only if the missile reinforced current conventional artillery weapons or directly supported maneuver operations.⁴⁴ Significantly, while this approach did not expressly preclude long-range missiles, it did restrict missiles based on target selection. In his book, Watson explained that Twining clearly distinguished between the service targets, proposing that the Air Force would develop missiles to "interdict enemy land forces, to isolate the battlefield, and to gain air supremacy."⁴⁵

While it appeared that a compromise between the services was close, the chiefs were slow to address the matter for numerous reasons. In reflecting on his personal JCS experience, General Maxwell Taylor, 1955–59 Army chief of staff, explained the challenges of resolving contentious issues by committee. He noted that the JCS always sought unanimity: "Since one dissenting Chief can prevent action on an issue for long periods, it is difficult to force consideration of matters unpalatable to one or more of the services."⁴⁶ Taylor elaborated:

Civilian superiors often express acute discontent over receiving split papers which they must then decide, the Chiefs have often

been inclined not only to spend excessive time in seeking compromises but even to sweep controversial issues under the rug, where they lie dormant for indefinite periods.⁴⁷

Not surprisingly, as missile restrictions were one of the most contentious inter-service issues, the matter was tabled at the JCS level. However, at the same time as the JCS discussion, Secretary of Defense Wilson was assessing service functions for clarity.

In March 1954, Wilson published DoD Directive 5100.1, which was a direct revision of the 1948 Key West Agreement.⁴⁸ In the first section of the directive, he set the new tone for the department, establishing that “no function in any part of the Department of Defense . . . shall be performed independent of the direction, authority, and control of the Secretary of Defense.”⁴⁹ While the directive did not change individual service functions, Wilson limited the JCS’s responsibility, removing the chiefs’ role in directing combat operations and elevating their respective service secretaries’ authority.⁵⁰

Wilson’s 1954 clarification of services did not directly impact missile competition between the Army and the Air Force; however, because the Regulus missile controversy had just occurred and the matter was brought to the Defense Department level, his decision to avoid addressing missile-development responsibility was deliberate. While Wilson asserted his authority to clarify functions, the overlap that led to effort duplication regarding missile development remained. Given that Wilson’s directive did not address missile-development responsibilities, the JCS would need to address the contentious issue.

In rehashing service missile-development responsibilities, the JCS once again utilized a consensus-based approach, which resulted in both compromise and ambiguity. In June 1954, the JCS appointed an ad hoc committee to examine the original 1950 missile-responsibility directive and draft an updated version.⁵¹ The committee consisted of a flag officer from each service with extensive missile experience: for example, the Navy representative, Rear Admiral John Sides, was the director of the Guided-Missiles Division in the Office of Naval Operations and previously was Keller’s Navy deputy in the Guided Missiles Office.⁵² Additionally, the Air Force member, Maj. Gen. Samuel Brentnall, was the assistant deputy chief of staff for Air Force guided missiles and had also served in the Guided Missiles Office.⁵³

In drafting the new missile agreement, the JCS directed the ad hoc group to focus on said vague and non-specific areas. Watson noted that the

JCS instructed them to recommend a change if “a task might be performed in two or more ways, or a single weapon could accomplish more than one task” but to keep the spirit of the original directive “since it was based on the sound premise that missile responsibility should follow assigned Service functions.”⁵⁴ While the committee intended to address the contentious points, the JCS provided the members limited guidance, so ambiguity persisted. One month after beginning the undertaking, the three-person committee submitted a draft of updated missile responsibilities to the JCS.⁵⁵

The committee did address specific issues regarding surface-to-surface missiles but failed to do so clearly. While the services generally accepted that strategic intercontinental missiles were the Air Force’s responsibility, it was harder to reach a consensus on more nuanced missions.⁵⁶ Despite their success at reaching some compromises and agreements, Maj. Gen. Harry Roper—the Army committee member—and General Brentnall only marginally reduced the ambiguity that plagued the first directive. For example, the members compromised that the Army would focus its missiles on “tactical targets of interest to the ground commander,” and Brentnall pushed to clarify that these “targets” were on the “battlefield.”⁵⁷ This led to the services separating missile responsibilities by the levels of war, with the Air Force managing strategic operations and the Army tactical operations.

Most significantly, vague terms such as “tactical target” and “battlefield” were not defined, and range restrictions were excluded. The new proposal, which was approved by Deputy Secretary of Defense Robert Anderson in November 1954, was similar to the 1950 memorandum it replaced, which allowed for continued misinterpretation. Watson sheds light on the glaring ambiguity of the finalized agreement, noting that “the Army would be allowed surface-to-surface missiles for use against tactical targets within the zone of Army combat operations, a rather elastic phrase that was left conveniently undefined.”⁵⁸ Once again, while the JCS’s intent was likely clear, abstract verbiage left room for interpretation. Additionally, without any mention of range restrictions, the Army could justify theater-support missiles at increasingly extended ranges as long as the intended target was “tactical.” Just one year later, this was the Army’s fundamental argument when the service submitted its IRBM proposal.

Continual use of abstract and undefined terminology, coupled with a requirement to reach a consensus, demonstrated the services were unable to internally resolve contentious issues. This fundamentally calls into question whether it is realistic to expect military representatives to subordinate their respective service interests in favor of DoD betterment. More

specifically, accepting a minor or non-existent role regarding emerging technology would be a hard choice for a senior officer to make, given that it would drop the service in prestige and budget. Predictably, less than a year after the 1954 missile agreement was signed, the outgoing and incoming Army Chiefs of Staff General Matthew Ridgway and Taylor faced this challenge. Extremely long-range missiles outside of the Army's theater-support requirements became a national priority, and developing one would require a very loose interpretation of the 1954 agreement. The threat of a Soviet Union surprise attack provided the catalyst for this rise in the strategic importance of missiles.

The Technological Capabilities Panel (TCP) and a Soviet Surprise Attack

In the first years of the Eisenhower administration, nuclear technology advanced exponentially; the United States was not the only superpower to make substantial leaps with its missile projects. Mississippi State professor Richard Damms explains: "No sooner had the New Look been adopted . . . than several developments seemed to undermine the implicit assumption of American superiority in science, technology, and nuclear weaponry."⁵⁹ In March 1954, President Eisenhower met with the Science Advisory Committee to the Office of Defense Mobilization (SAC-ODM) to discuss the growing threat of a nuclear attack by the Soviets. Eisenhower challenged the SAC-ODM to analyze ways the United States could reduce the threat of a surprise attack from the Soviet Union. According to Damms, the president hoped the SAC-ODM—to be led by academic James Killian—could provide a strategic assessment to the government that would guide a weapons development program "untainted by narrow service interests."⁶⁰ Killian subsequently divided the project into three focus areas to steer the newly formed TCP (see Figure 3.1). David Snead—a history professor at Liberty University—details the importance of this decision:

The creation of these three panels reflected key assumptions that guided the steering committee. First, it viewed offensive and defensive weapons as integrated components in the defense of the United States. Second, it believed that continental defenses, ranging from early warning to anti-aircraft weapons, were inadequate. Finally, it recognized that the acceleration of Soviet technological developments increased US vulnerability.⁶¹

Ultimately, this comprehensive view influenced the TCP's approach to its research and shaped its conclusions.

	Focus Area	Chairman
Panel 1	US Offensive Capabilities	Marshall Holloway
Panel 2	US Continental Defense	Leland Haworth
Panel 3	US Intelligence Capabilities	Edwin Land

Figure 3.1. Technological Capabilities Panel Focus Areas.

Source: Created by the author from David Snead, *The Gaither Committee, Eisenhower, and the Cold War* (Columbus, OH: Ohio State University Press, 1999), 36.

Not insignificantly, Eisenhower believed research on the topic might illuminate unnecessary defense projects and fit with his continual efforts toward fiscal conservatism. Damms explains: “Eisenhower hoped that Killian and other technical advisers would strengthen his hand in resisting calls from the military services and their allies for major increases in defense.”⁶² Ironically, the TCP report did the opposite, sparking a contentious inter-service missile competition.

Strategically, Killian organized a team of scientists for the TCP that, according to Damms, “collectively . . . represented the elite of the nation’s evolving military-industrial-academic complex.”⁶³ The panel undertook an intense study to assess the Soviet problem in-depth. Damms summarizes the complexity of the research endeavor:

Killian and the TCP interpreted their mandate broadly, examining the problem of surprise attack within the larger framework of overall offensive and defensive power. During four months of intense activity, the steering committee and its project teams conducted over 300 meetings, undertook field trips to such major military installations as the headquarters of the Strategic Air Command and the Air Defense Command, and met with dozens of top government officials from the White House, Pentagon, State Department, CIA [Central Intelligence Agency], AEC [Atomic Energy Commission], and other agencies.⁶⁴

The TCP completed an extensive report and, at the beginning of 1955, Kilian and his team directly briefed President Eisenhower on their findings. The organization's presentation would serve as a catalyst for the inter-service missile race and the Army's Jupiter missile pursuit.

Conclusion

The first two years of the Eisenhower administration set the stage for the eventual Jupiter missile controversy; the Army began transitioning from testing missiles to creating actual missile battalions in the force, demonstrating the service's technical capacity. Additionally, based on its established operational requirements, the Army worked to extend its missile ranges out to 500 miles because there was a belief that the future battlefield "zone of operations" required processing of targets in-depth.⁶⁵ Simply put, the ambiguous wording in the 1950s missile-responsibility agreement led to inter-service tension and overlap—brought to the forefront by the Regulus missile controversy.

Secretary of Defense Wilson did not address the underlying service function debate regarding missiles, and the JCS imposed its own restrictions. However, while the JCS updated service missile responsibilities, the organization's continued delineation of missions through abstract and undefined terms such as "tactical targets" and "zone of Army combat operations" brought attention to the organization's inability to resolve missile issues at its level. When the TCP identified a strategic need for IRBMs at the beginning of 1955, the Army was both willing and able to compete for the opportunity to develop what became the Jupiter missile given the absence of actual development restrictions.

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Chapter 4

1955–1956: The Jupiter Missile Controversy

From 1955 to 1956, the Army and the Air Force competed for missile responsibilities. This two-year period of inter-service competition is significant because it spans the entirety of the Army's Jupiter missile pursuit, from the scientific community's March 1955 identification of intermediate-range ballistic missiles (IRBMs) as strategically important to Secretary of Defense Charles Wilson's November 1956 service function clarification memorandum. Analysis of events surrounding IRBM decisions during this period provides insight into the challenges associated with managing emerging technology and illuminates three significant factors regarding the Army's Jupiter missile pursuit. First, the Army broadly interpreted the vague language in the 1954 missile-responsibility agreement to pursue an IRBM that it could not operationally justify. Second, the effects of effort duplication became apparent to military leaders and President Dwight Eisenhower, putting into question the Army's need for an IRBM. Last, Wilson demonstrated his centralized authority regarding weapon modernization by establishing clear missile restrictions. This chapter examines the rise of IRBMs as a strategic necessity, the dual-track approach to the emerging technology's development, and Wilson's service function clarification memorandum.

The Rise of IRBMS

As directed by Eisenhower in 1954, academic James Killian and the Technological Capabilities Panel (TCP) compiled a detailed report on the growing Soviet threat. In February 1955, the organization submitted "Meeting the Threat of Surprise Attack" to the White House for review.¹ One month later, Killian and his team briefed their significant findings to Eisenhower and the National Security Council (NSC).² Senior military leaders, including service secretaries and chiefs, were all in attendance and heard firsthand the TCP's unfiltered recommendations regarding weapon modernization priorities.³

In its report, the TCP compared US and Soviet Union nuclear delivery capabilities, and assessed the way modernization would adjust the parity between them.⁴ This structure illuminated vulnerabilities the United States could address to deter a potential Soviet strike while maintaining a strategic advantage. According to the TCP, successful missile development was imperative for US security. In particular, the panel identified that intercontinental ballistic missile (ICBM) development

would “profoundly affect the military posture of either country.”⁵ The research organization recommended that the NSC “formally recognize the present Air Force program for the development of an [ICBM] as a nationally supported effort of highest priority.”⁶ Killian and his team emphasized the importance of ICBMs and noted that the missile should “continue to receive the very substantial support necessary to complete it at the earliest possible date.”⁷ After detailing the potential nuclear crisis with the Soviet Union, the TCP identified extremely long-range missiles as a strategic necessity. Sarah Bridger, a Cal Poly history professor, describes how the TCP’s conclusions elevated the strategic importance of missiles: “Most crucially, the panel predicted that by the end of the decade, the age of the bomber would wane and the age of intercontinental and intermediate range missiles would begin.”⁸ Although ICBM development became a top priority, the technology was immature and would require an interim solution.

Specifically regarding the Jupiter missile, the TCP recommended a 1,500-mile-range missile—eventually designated as an IRBM.⁹ While ICBMs were the priority, this secondary missile proposal was a more feasible short-term goal. Former US ambassador Michael Armacost notes: “While no specific military requirement existed at the time [for an IRBM], a consensus emerged within the circle of influential scientific advisers that a missile with this range could be developed, with a reasonable certainty of success, in time to meet the challenge of new Soviet missile capabilities.”¹⁰ Importantly, the TCP advised decision-makers to consider both land- and sea-launched IRBM variants.¹¹

In August 1955, five months after the TCP presentation, the NSC reconvened to discuss potential recommendations.¹² At the session, Secretary Wilson acknowledged that the Department of Defense (DoD) previously decided not to pursue a 1,500-mile missile and appeared pessimistic about the weapon’s potential.¹³ He warned the DoD had too many active projects and that “big rockets cost twice as much or more than a plane, and can only be used once.”¹⁴ However, Wilson informed the NSC that he was assessing five potential IRBM development plans for feasibility and planned to brief his recommendations in December.¹⁵ Eisenhower acknowledged the IRBM December follow-up meeting and offered executive guidance regarding the new missile.¹⁶ While the president wished to develop some IRBMs as a “threat and a deterrent,” he did not “want to produce them in quantity” as the United States could not “fight that kind of war.”¹⁷ Even though the president only viewed IRBMs as a minor addition to the military arsenal, he recognized their strategic importance. After his

presidency, Eisenhower reflected on the challenge facing Wilson in developing these new missiles:

It became clear that the matter of developing ballistic missiles was urgent . . . and our development programs were promptly accorded the highest priorities. While it was easy to direct the Defense Department to go full speed ahead, it was not so easy to devise the best organization of the missile program itself.¹⁸

Ultimately, before Wilson briefed the department's IRBM plan in December, he needed to determine which service would develop the new missile.

The Defense Department's IRBM Development Plan

Since neither Wilson nor the JCS established concrete restrictions on missile development in the 1950 or 1954 missile agreements, the Army was free to interpret its missile needs. However, Armacost points out that while the JCS "never specifically restricted the range of Army surface-to-surface missiles" in the 1954 memorandum, the other services "presumed that [the Army] would develop and deploy only tactical" missiles.¹⁹ Ultimately, the JCS's use of non-specific terms such as "tactical targets" and "zone of Army combat operations" allowed the services to interpret the intent of the terms.²⁰ Regarding IRBMs, historian Robert Watson comments: "The Army might seem excluded under the 1954 agreement, but that service was soon to contend that the 'zone of combat operations' was in fact deep enough to justify use of 1,500-mile missiles."²¹ General Matthew Ridgway was the Army chief of staff when the 1954 agreement was made, but General Maxwell Taylor took over the position in June 1955, prior to the Army's Jupiter missile pursuit. Then and now, unspecific wording may be interpreted differently not just between services, but also within a service. Given the consistent turnover of service leadership, ambiguous language inherently limits a policy's effectiveness and longevity. Stated simply, as each JCS service chief is replaced, policy with unclear wording can be interpreted differently.

While tactical missiles remained an Army development priority, the service continued to make strides toward its theater-support missile requirement—including its first Corporal medium-range missile units established in 1955. Historians James Grimwood and Frances Strowd detail challenges with maintaining fire support across a large and fluid battlefield, underscoring that "airlifted assaults over great distances might characterize Army operations, and the transport" of Army missiles "might pose a serious logistic problem."²² Consequently, extending the range of Army missiles limited the requirement to move them. Grimwood and Strowd

commented: “The launching of a long-range ballistic missile from a relatively rear area might prove quite effective as well as economical.”²³ Quick to capitalize on the newfound strategic importance of long-range missiles, the Army Staff queried Army missile scientists at Redstone Arsenal in March 1955 regarding the feasibility of creating a missile capable of reaching 1,000 to 1,500 miles.²⁴

By this point, the Army had conducted numerous test flights of its Redstone missile—the service’s first attempt at a theater-support missile. Headed by engineer Wernher Von Braun, the Army team at Redstone Arsenal was confident it could repurpose the missile’s parts and achieve ranges upward of 1,000 miles.²⁵ While the Army had the technical knowledge to extend the range of its missiles, there was no new assessment that established a new operational requirement to extend its established 150- to 750-mile theater-support missile plans. Therefore, to justify its technical pursuit, the Army had to determine how far to push the boundaries of its undefined tactical battlefield. Without restrictions and given lingering doubt that the Air Force would willingly support land operations, the Army had no reason to limit the expansion of its fire support capabilities on a nuclear battlefield. Even so, Army Chief of Staff General Matthew Ridgway, who retired in June 1955, was hesitant to propose extending the Army’s theater support requirements.

Ridgway suggested that instead of pursuing a new project, the Army should extend the Redstone missile’s range to 500 miles—the Army’s original goal range for the missile.²⁶ According to Armacost, “Ridgway’s preference for a more modest extension in missile capabilities may have grown out of his awareness that acceptance of a new project is more likely if it can be ‘sold’ as a necessary modification of an existing program.”²⁷ He adds that Ridgway “may also have been attempting to meet an existing requirement” for theater-support missiles, “while averting a premature clash with the Air Force over the hitherto undefined limits of Army tactical missiles.”²⁸ Although the language in the 1954 missile-responsibility memorandum was vague and undefined, Army leaders like Ridgway apparently understood its intent. Having personally experienced the backlash of the Regulus missile controversy, Ridgway no doubt recognized the Air Force’s protective attitude regarding extremely long-range missiles. As a result, Ridgway, or his replacement, had to interpret the vague language in the 1954 missile-responsibility agreement broadly if the Army was to continue down the IRBM path.

In June 1955, Von Braun presented his team’s assessment for building a 1,000-mile capable missile to the Armed Services Policy Council—

an advisory board for the defense secretary.²⁹ The Redstone Arsenal team proposed that Redstone efforts shift to a new missile with a 1,000-mile range.³⁰ One month later in July 1955, Von Braun again briefed the advisory committee and proposed that his team instead should develop a newly identified 1,500-mile-range missile.³¹ The Army had the technological capability to dramatically extend the range of its missiles, even if the service could only loosely justify the need. However, because no restrictions existed to prevent the Army from expanding their tactical requirements, the service officially vied to produce IRBMs.

After the August NSC meeting, the DoD had three months to create and brief a formal IRBM development plan from its five potential options. According to Grimwood and Strowd, these distinct programs included “a by-product of the ATLAS ICBM program, . . . a United States (US)-United Kingdom (UK) cooperative development program, a Navy ship-based ballistic missile, and the Navy TRITON missile.”³² Although it was not included in any of the DoD primary courses of action, the Army continued to compete. In fact, it challenged the feasibility of the DoD’s other IRBM options, arguing that the ICBM by-product detracted from the Air Force’s Atlas development, the United Kingdom was inexperienced, and the Navy’s Triton missile was non-ballistic and therefore, could not effectively be repurposed.³³

The Army proposed that the Redstone Arsenal team should conduct the missile development because of its experience and equipment.³⁴ While the other services recognized the Redstone Arsenal team’s capabilities, the Air Force was not interested in giving up developmental control. In fact, the Air Force proposed that the Redstone Arsenal team be broken up and utilized across the services, a request that Secretary of the Army Wilbur Brucker rebuked.³⁵ In September 1955, Von Braun gained a direct audience with Secretary Wilson to outline the benefits of having the Redstone Arsenal Team develop an IRBM, which included an experienced team of scientists, viable facilities, and the repurposing of missile parts.³⁶ In October, the Army Staff made similar arguments to JCS Chairman Admiral Arthur Radford; shortly thereafter, in anticipation of approval, Army Chief of Staff General Taylor directed the Army to begin the IRBM development plan.³⁷

Wilson’s Decision and Eisenhower’s Approval

The Army did not have to wait long for Wilson’s final decision. In November 1955, in preparation for the December brief to the NSC, the DoD submitted its missile development recommendations.³⁸ The department eliminated most of the potential IRBMs and moved forward with

only two projects, a surface- and a sea-launched IRBM variant.³⁹ Air Force historian Max Rosenberg comments that the inter-service competition for IRBM development approval ended “in the fashion of so many of the earlier missile disputes—in a compromise. It was a compromise not completely satisfactory to any of the services and, more significantly, not completely satisfactory as the solution to the problem at hand.”⁴⁰ The first—designated as IRBM number one—was a land-based Air Force program. The second—designated as IRBM number two—was an Army-Navy joint project with the “dual objective of achieving an early ship-launched capability and also providing a land-based alternative to the Air Force program.”⁴¹ Markedly, before the services began IRBM development, the DoD had established the Air Force IRBM as a higher priority than the Army’s. Although the numerical designation could be viewed as a simple distinction, describing the Army’s effort as an “alternative to the Air Force” left little room for interpretation.

Additionally, Wilson assigned Secretary of the Navy Charles Thomas as chairman for the joint venture and assigned Secretary of the Army Brucker the subordinate role of vice-chairman.⁴² Wilson made it clear that the second IRBM was first and foremost a Navy project. In fact, beyond the experience of the Redstone Arsenal team, the Army’s authorization to develop the alternate land IRBM was proposed because “in the development of a missile for ship-launching it is necessary to go through a land-launched phase;” thus an alternate land-based missile could be developed with minimal modifications.⁴³ Taking this into account, the Army’s IRBM project from the onset was viewed as an accepted effort duplication.

Before briefing the DoD’s missile plan, Wilson addressed the NSC regarding some budgetary issues related to the new capabilities, noting that the requirements “were putting a very expensive load on the budget of the Defense Department,” with estimates of “approximately \$45 billion a year for some years” to build these capabilities.⁴⁴ With the 1957 established budget at \$38.5 billion, both Wilson and JCS Chairman Admiral Radford expressed concern to the NSC regarding the DoD’s ability to meet expectations.⁴⁵ Missiles, in particular, complicated this issue (see Figure 4.1). Shortly after submitting its report, the DoD presented its proposal to the president and the NSC.

In December 1955, Deputy Secretary of Defense Reuben Robertson began the missile presentation by outlining the DoD’s plan for the two IRBMs. Eisenhower was surprised by the DoD plan and questioned the lack of IRBM development progress since his July directive.⁴⁶ Significantly, the president officially elevated IRBMs to the same level of priority as

	1955 (in millions)	1956 (in millions)	1957 (in millions)
ICBM	\$156	\$355	\$582
IRBM	\$ 0	\$ 89	\$269

Figure 4.1. Estimated ICBM & IRBM Expenditures 1955–1957 (millions).

Source: Department of Defense, “Report on the Department of Defense Intercontinental Ballistic Missile and Intermediate Range Ballistic Missile Programs, November 30, 1955,” in *Foreign Relations of the United States, 1955–1957, National Security Policy 19* (Washington, DC: United States Government Printing Office, 1990), 166, <https://history.state.gov/historical-documents/frus1955-57v19/d44>.

ICBMs for research and development.⁴⁷ Eisenhower later reflected on this decision and the importance of emphasizing IRBM development:

I realized that the political and psychological impact on the world of the early development of a reliable IRBM would be enormous, while its military value would, for the time being, be practically equal to that of the ICBM, since the former located on bases on foreign soil, could strike any target in Communist areas as well as could an ICBM fired from the United States.⁴⁸

This realization aside, Eisenhower had reservations about the dual-track missile development and was reluctant to approve the duplicative effort.

Three weeks after the DoD presentation, on 21 December 1955, Eisenhower formally approved the DoD missile development plan, allowing the Army to pursue the Jupiter missile in earnest. He explained his approval in an official memorandum to Secretary of Defense Wilson:

It was with some qualms that I approved the plan of allowing three different Services to work on the problem of long-range ballistic missiles. . . . However, on your assurance that in the current plan all such differences were, and would continue to be, eliminated and that in your opinion two separate programs could be carried on simultaneously and with the resulting benefits of competition, all to be achieved without mutual interference, I approved the system that the Defense Department suggested.⁴⁹

Although Eisenhower authorized all the services to develop IRBMs, he apparently feared the DoD was not effectively handling the problem. Mississippi State professor Richard Damms comments: “Ironically, Eisenhower’s decisions in the missile field fostered the very interservice rivalry that he had hoped to circumvent by turning to SAC-ODM in the first place.”⁵⁰ Essentially, with these actions, Eisenhower enabled the inter-service IRBM race.

The IRBM Race—The Dual-Track Approach and the Army’s Jupiter Missile

Given Secretary Wilson’s indecisive history and avoidance of missile disputes, the Army’s successful creation of an IRBM could be directly associated with its operational employment, which would particularly apply if the Army developed the missile before the Air Force. While this premise was faulty—with Wilson resolving the issue well before missile completion—it drove competition between the services. Watson explains: “The two development teams raced to be the first to produce a usable weapon” to support their respective service claims regarding IRBM usage.⁵¹ In 1956, the race officially began in earnest, with the Air Force and the Army taking distinct IRBM development approaches. However, neither service made much progress with their respective missiles before Wilson clarified service functions in November 1956. The following section analyzes the Army’s general approach and philosophy regarding the Jupiter missile.

While the dual-use Army-Navy missile plan may have seemed a logical means to develop an alternate land-based IRBM, respective service-specific requirements hampered the missile’s progress for both organizations. Particularly, balancing Navy preferences created a challenge for the Army; its project—the Jupiter missile—was a secondary objective to the sea-launched IRBM variant. Grimwood and Strowd explain that problems between the services “stemmed mainly from the reconciliation of requirements for the two services into a single missile.”⁵² The most significant issues revolved around fuel type. The Army’s previous missiles, the Redstone and Corporal, used liquid fuel. Because the Army’s Jupiter development plan relied heavily on its previous experience—and to some extent the repurposing of equipment from these missiles—logically, the Army intended to use liquid propellant for the Jupiter.⁵³ In contrast, the Navy preferred to design a missile that used solid fuel because it was “safer and more convenient to store and handle,” offering significant advantages “for shipboard use.”⁵⁴ In April 1956, Wilson authorized the Navy to study the potential feasibility of solid fuel for the sea-launched IRBM.⁵⁵

In addition to fuel, the two services were at odds on missile size, because technological advancements in warhead miniaturization made smaller missiles possible. Grimwood and Strowd note that while the “Army could handle a rather lengthy weapon, the Navy required a weapon as short as possible” because of ship limitations.⁵⁶ In sum, early into joint-IRBM development, it became clear that the Army’s project was not the natural derivative of the Navy missile as was initially intended. Because the sea-based IRBM variant remained a DoD requirement, the Navy’s project was never in jeopardy. However, the potential setbacks did not deter the Army from developing a land-based IRBM distinct from the Air Force.

The Army did not view the Air Force’s IRBM—Thor—as a threat to the Army mission to conduct land warfare; instead, the Army apparently accepted this overlap and effort duplication. Armacost notes: “The Army was not pursuing a quest for exclusive jurisdiction over the IRBM.”⁵⁷ In contrast, because the Air Force was concerned with service function encroachment, the Army’s authorization to develop an IRBM was considered a threat to assigned Air Force missions. Further, Boston University history professor and retired Army Col. A. J. Bacevich comments that to the Air Force, “successful Army missile initiatives could undercut the rationale for Air Force bomber or missile programs. Thus, the Air Force was determined that if the United States needed an IRBM, it would be its own candidate, Thor.”⁵⁸

The Army envisioned the IRBM’s military purpose as a mobile missile that—unlike Thor—could be maneuvered around the battlefield and would be less vulnerable to a Soviet surprise attack.⁵⁹ General James Gavin argued this point: “All nuclear missiles should be highly mobile,” pointing out that “the Germans learned this lesson in World War II, when their concrete bases were completely destroyed, while their mobile missile units were not harmed until overrun by our ground forces.”⁶⁰ In 1958, Gavin reflected on the Army’s goals for the new missile:

I was responsible for developing the tactical characteristics of the Army’s [IRBM], the Jupiter. It was designed to be as mobile as any piece of equipment in the present-day field army. It was designed for movement on highways to launching areas through all kinds of weather.⁶¹

It should be noted that missile characteristics—mobile instead of fixed-site—do not fundamentally alter a weapon’s role.

Over the course of the year, the services remained in direct competition, respectively assuming that their technological successes would

warrant operational responsibility. Service function adjustments remained Secretary Wilson's authority, and although the Jupiter was the "alternate" IRBM, there was nothing to suggest that he planned to clarify missile-employment responsibilities. In fact, the DoD set the precedent of non-decision regarding guided missiles. Armacost notes: "The Thor-Jupiter controversy might have been rendered clearer by a Secretary of Defense confident of his grasp of the strategic issues and determined to provide legislative leadership in defense policymaking."⁶² Instead, Wilson's leadership approach fostered inter-service competition between the Army and the Air Force. Before Wilson eventually resolved the issue—and, to avoid similar effort duplication—Eisenhower weighed in on the Army's Jupiter pursuit and provided his expectation for the JCS.

Questioning the Army's Jupiter Pursuit and Effort Duplication

On 22 March 1956, three months after issuing his IRBM guidance, Eisenhower formally discussed his concerns regarding duplicative military efforts with the JCS.⁶³ The president noted that "since there were several programs designed to produce long-range or shorter-range missiles, the exercise of selectivity would ultimately permit us to concentrate on the best long-range missile and the best short-range missile."⁶⁴ Specific to the land-based IRBM debate, his comment suggested that the DoD should eventually settle on either the Air Force's Thor or the Army's Jupiter. Based on the initial directive, the sole requirement was a single land-based IRBM, and Eisenhower's comment reinforced the Army's "race" to operationalize the Jupiter. Armacost explains it was "widely assumed that either the Thor or the Jupiter project would be eventually cancelled, and the Air Force missile had been designated IRBM No 1."⁶⁵ JCS Chairman Admiral Radford acknowledged the president's intent and subsequently informed Eisenhower that the problem of redundant systems extended beyond the IRBM race and included numerous missile types.⁶⁶

One week after Radford's comments, Eisenhower again raised his concerns regarding IRBMs during a budget meeting with DoD officials.⁶⁷ DoD notes from the meeting highlight the president's aversion to an Army IRBM project: "The President questioned why the Army should have a 1,500-mile ballistic missile program, since the Army does not have the equipment to see where they are hitting."⁶⁸ Beyond expressing doubt regarding the Army's IRBM, the president indicated the Air Force "ought to be the boss" of these new long-range guided missiles.⁶⁹ Without explicitly directing the DoD, Eisenhower weighed in on IRBM service function, underscoring his frustration with the ongoing effort duplication. Importantly,

the services did not have a representative at the meeting, so Eisenhower made these comments to Deputy Director of Defense Charles Robertson and Admiral Radford.

The following day, Eisenhower continued the conversation with the JCS, commenting to the service chiefs that he viewed “1,500- and 5,000-mile missiles as being in the same class operationally. . . . It would be most harmful to have public quarreling over the responsibility for employment of such missiles.”⁷⁰ With this comment, Eisenhower identified a potential secondary consequence of the accepted effort duplication that Wilson may not have accounted for. Because the Army’s IRBM pursuit was a divisive point between the services, Eisenhower followed up his JCS meeting with a one-on-one meeting with Army Chief of Staff General Maxwell Taylor.

When Eisenhower met with Taylor in April 1956, it was an informal conversation about Army programs such as guided missiles and aviation.⁷¹ Regarding missiles specifically, Taylor updated the president on the three Army missile types—short-, medium-, and long-range—and described how the Army would employ these systems on its envisioned future battlefield.⁷² Eisenhower quickly turned the conversation to the Jupiter missile and questioned Taylor directly on whether there was an Army utility to firing a missile 1,500 miles.⁷³

Taylor explained to the president that the Jupiter was “being developed by the Army to take advantage of Redstone experience,” but confessed that “the Army had no clear proposals for using it at this time.”⁷⁴ While Taylor discussed the potential for a theater-support missile operating in North Africa or Central Europe, the president expressed doubt about such an endeavor’s coordination and accuracy.⁷⁵ Taylor appealed that “no decision be taken now freezing the Army out. . . . It should be up to the Army to incorporate what they can best use in the performance of their operations. . . . There is good reason to feel that close-support air operations are fading out of the picture. Missiles will take over this function.”⁷⁶ The president implied that he did not support the Army’s Jupiter pursuit, as he generally opposed “a service assuming or duplicating a function simply because of lack of confidence that another would perform it.”⁷⁷ Further, Eisenhower stressed to General Taylor that if the Air Force was not fulfilling its primary support functions such as interdiction and support to combat operations, the Army needed to address the issue with Secretary Wilson or directly with him.⁷⁸ Shortly thereafter, Eisenhower began to see the secondary impacts of IRBM effort duplication, and his dissatisfaction with these projects began extending beyond missile development.

Over the course of his time in office, Eisenhower was regularly frustrated with the JCS, particularly regarding budget issues. Eisenhower confided to his long-time friend Everett Hazlett:

When each Service puts down its minimum requirements for its own military budget for the following year, and I add up the total, I find that they mount at a fantastic rate. There is seemingly no end to all of this. Yet merely 'getting tough' on my part is not an answer. I simply must find men who have the breadth of understanding and devotion to their country rather than to a single Service that will bring about better solutions than I get now.⁷⁹

In March 1956, the president discussed these issues with the JCS, explaining that he expected "each Chief to subordinate his position as a champion of a particular Service to his position as one of the overall national military advisors."⁸⁰ He demanded that the JCS—and, by extension, its subordinate committees—overcome individual service prerogatives and asked JCS members to "seek to be the first to suggest places where the program can be cut—particularly on a basis of one Service giving up a function if another Service would perform it."⁸¹ In essence, Eisenhower envisioned a selfless JCS and was hopeful the organization could embrace a collaborative mindset.

The following week on 5 April 1956, Eisenhower followed up on his JCS expectations. The president directed that the assembled DoD representatives should express the "corporate opinion," adding that "single service opinions and points of view are not of value."⁸² A month later, Eisenhower expressed disappointment that "the Chiefs of Staff system we now have has failed. . . . Apparently the system is wrong."⁸³

This failure to cooperate raises fundamental questions regarding the JCS's ability to manage emerging technology. The 1950s missile issues underscore that individual chiefs face challenges in subordinating their service priorities to support the larger military mission. Although the modern emphasis on joint operations did not exist in the 1950s, Eisenhower was concerned about effort duplication and set clear expectations for the JCS. However, based on the missile competition in the 1950s, inter-service competition and unnecessary duplication regarding emerging technology are likely to occur when policy that outlines its use and development is ambiguous. To mitigate unwanted competition, a central authority must establish clear service responsibility—even if inclusive—and not anticipate an altruistic approach from the services.

Resolving the Jupiter Missile Controversy

In August 1956, frustrated with the Army's encroachment on its assigned missions, Secretary of the Air Force Donald Quarles attempted to halt the Army's Jupiter missile project by asking Secretary of Defense Wilson to clarify missile responsibilities. Quarles urged Wilson to restrict the Army's ability to develop surface-to-surface missiles to systems with a range of 200 miles or less.⁸⁴ Historian Kenneth Condit wrote that Quarles justified his proposed range restriction by arguing that it allowed the Army to place their systems a "suitable distance behind front lines and still strike targets 100 miles beyond those lines."⁸⁵ Of note, Quarles's objective in airing grievances to Wilson was not to justify the Air Force's project. Instead, as was consistent with the Air Force's missile complaints throughout the 1950s, Quarles attempted to discredit the Army's capability need and gain full control of the new weapon. This point reinforces the differing views of the services. By directly associating missiles with service functions, the Air Force portrayed Army missile projects as an attempt to obtain resources and missions unjustly. In contrast, the Army viewed missiles as a battlefield tool, unconcerned with effort duplication or its implications on service functions.

Proactively, Secretary Wilson asked the JCS to review Quarles's proposal before making any decisions. Similar to the Air Force's earlier range restriction proposals, the other services initially opposed the 200-mile restriction as an arbitrary and unnecessary limitation that could have long-term impacts on future warfare capabilities.⁸⁶ General Taylor—supported by Chief of Naval Operations Admiral Arleigh Burke—contended "ground combat operations of the future would require weapons systems of considerably greater range than those now available, which, because of superior accuracy and dependability, should be guided missiles under Army control rather than Air Force fighter-bombers."⁸⁷ Unsurprisingly, Air Force Chief General Nathan Twining supported Quarles's recommendation. Echoing the Regulus missile controversy from 1953, the Air Force was once again outvoted in missile disputes.

Twining reframed the range-restriction argument, instead shifting the debate to clarity and efficiency: "The assignment of responsibility made by the Secretary of Defense in November 1954 was in general terms and subject to varying interpretations; a specific range limit was needed to prevent costly duplication of effort."⁸⁸ This highlights the continuing issues with equivocal language regarding missile development. Additionally, it demonstrates that the military members of the time were aware of

the effort duplication allowed by the policies and the respective cost to the DoD. Importantly, building on the arguments of his predecessors, Twining contended the Army could not exploit an explosion beyond 100 miles; anything beyond that distance should be categorized as an interdiction mission, an Air Force responsibility.⁸⁹

Next, the JCS convened to discuss Quarles's recommendation and prepare a formal report for Wilson. While the respective services had already outlined their positions, Admiral Radford offered his opinion. He sided with the Air Force but was more flexible on the specific mile restrictions, suggesting the Army's limit extend to 250 miles.⁹⁰ After failing to reach consensus during the meeting, the JCS submitted four separate statements to Wilson on 25 October 1956; only Taylor argued against range restrictions.⁹¹ Wilson would need to make the final determination himself.

In November 1956, frustrated because the service chiefs were unable to reach a consensus on numerous contentious issues, Wilson took action. In his "Clarification of Roles and Missions to Improve the Effectiveness of Operation of the Department of Defense" memorandum, Wilson addressed five significant inter-service competition issues: Army use of aircraft, adequacy of airlift, air defense, Air Force support to the Army, and IRBMs.⁹² Unlike the vague instructions in previous communications, Wilson stressed that clarification of responsibilities was necessary to establish explicit and directed changes to better the department: "There are times when conditions require that changes should be made in administrative responsibilities and at such times decisions are mandatory. That is the situation now."⁹³ Wilson had observed, as did many others, a growing misinterpretation of intended responsibilities across numerous missions: "Development of new weapons and of new strategic concepts, together with the nine years operating experience by the Department of Defense have pointed up the need for some clarification and clearer interpretation of the roles and missions of the armed services."⁹⁴

In the new policy, Secretary Wilson explicitly addressed missile development. He declared: "Operational employment of the land-based Intermediate Range Ballistic Missile system will be the sole responsibility of the U.S. Air Force."⁹⁵ Additionally, the secretary imposed specific range restrictions: "The U.S. Army will not plan at this time for the operational employment . . . of any other missiles with ranges beyond 200 miles."⁹⁶ This restriction mirrored the Air Force recommendation. Wilson's memo also defined the Army zone of operations "as extending not more than 100 miles beyond the front lines."⁹⁷ This wording was a departure from the

1954 missile-responsibility memorandum, in which the Army's zone of operations was undefined and continually misinterpreted.

In addition to clarifying these issues to the respective services, Wilson published his memorandum to Congress and released it to the press.⁹⁸ By using his office authorities, Wilson publicly reinforced the Army's missile development responsibilities. Armacost comments that Wilson did not want "to leave a series of unresolved disputes to his successor."⁹⁹ Conspicuously, less than a year after publishing this controversial memorandum, Wilson retired from office.¹⁰⁰ Although the Army was quick to reopen the conversation to gain a theater-support missile—a requirement that Wilson disregarded—the 1956 missile policy demonstrates the secretary of defense's essential role in emerging technology management.

Conclusion

Inter-service competition dominated the latter half of Eisenhower's first term. Ambiguous language regarding established service functions and in subsequent missile-responsibility memorandums allowed the Army to compete for a weapon system without a justifiable service need. Armacost comments: "It was difficult to persuade the Air Force, the Secretary of Defense, and the President that such a rocket could appropriately be designated 'tactical.'"¹⁰¹ Although Eisenhower authorized the dual-track IRBM approach, he did so grudgingly and continued to question the effort duplication and its impact on his fiscally conservative policies. Additionally, the president was frustrated that JCS members did not subordinate their individual interests. Likewise, after years of indecision, Wilson finally resolved the most contentious DoD issues through clear and concise language. His 1956 service function memorandum drastically altered the Army's missile development authorities, forcing the Army to readdress its role on the future battlefield. Texas A&M history professor Brian Linn explains that the new policy not only "destroyed the service's space rocket program but also undercut its ability to wage the long-range, mobile, deep-penetration operations called for in its atomic war doctrine."¹⁰² Overall, the lessons from the Army's Jupiter missile pursuit—and the services' inability to delineate developmental responsibility for missiles—illuminate the challenges of efficiently managing emerging technology.

Notes

1. Technological Capabilities Panel, "Report by the Technological Capabilities Panel of the Science Advisory Committee, Washington, February 14, 1955: Meeting the Threat of Surprise Attack," in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 41–56, <https://history.state.gov/historicaldocuments/frus1955-57v19/d9>.

2. J. Patrick Coyne, "Memorandum of Discussion at the 241st Meeting of the National Security Council, Washington, March 17, 1955: Report to the President by the Technological Capabilities Panel," in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 63–68, <https://history.state.gov/historicaldocuments/frus1955-57v19/d17>.

3. Coyne.

4. Technological Capabilities Panel, "Report by the Technological Capabilities Panel of the Science Advisory Committee."

5. Technological Capabilities Panel, 44.

6. Technological Capabilities Panel, 46.

7. Technological Capabilities Panel, 48.

8. Sarah Bridger, *Scientist at War: The Ethics of Cold War Weapons Research* (Cambridge, MA: Harvard University Press, 2015), 15–16.

9. Technological Capabilities Panel, "Report by the Technological Capabilities Panel of the Science Advisory Committee," 48.

10. Michael Armacost, *The Politics of Weapons Innovation: The Thor-Jupiter Controversy* (New York: Columbia University Press, 1969), 51.

11. Technological Capabilities Panel, "Report by the Technological Capabilities Panel of the Science Advisory Committee," 48.

12. James Lay and Robert Johnson, "Memorandum of Discussion at the 257th Meeting of the National Security Council, Washington, August 4, 1955: Recommendations of the Report to the President by the Technological Capabilities Panel of the Science Advisory Committee," in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 95–108, <https://history.state.gov/historicaldocuments/frus1955-57v19/d30>.

13. Lay and Johnson, 101–2.

14. Lay and Johnson, 101.

15. Lay and Johnson, 101.

16. Lay and Johnson, 101.

17. Lay and Johnson, 101.

18. Dwight Eisenhower, *Mandate for Change, 1953-1956: The White House Years* (Garden City, NY: Doubleday & Company, 1963), 456.

19. Armacost, *The Politics of Weapons Innovation*, 82.

20. Robert Watson, *The Joint Chiefs of Staff and National Policy 1953–1954*, History of the Joint Chiefs of Staff, vol. 5 (Washington, DC: Office of Joint History, Office of the Chairman of the Joint Chiefs of Staff, 1998), 185.

21. Robert Watson, *Into the Missile Age: 1956–1960*, History of the Office of the Secretary of Defense, vol. 4 (Washington, DC: Historical Office, Office of the Secretary of Defense, 1997), 160.

22. James Grimwood and Frances Strowd, “History of the Jupiter Missile System” (Declassified Government Report, History & Reports Control Branch Management Services Office, US Army Ordnance Missile Command, Redstone Arsenal, AL, 27 July 1962), 5–6, <http://heroicrelics.org/info/jupiter/jupiter-hist/History%20of%20the%20Jupiter%20Missile%20System.pdf>.

23. Grimwood and Strowd, 6.

24. Grimwood and Strowd, 6.

25. Grimwood and Strowd, 3.

26. Armacost, *The Politics of Weapons Innovation*, 48.

27. Armacost, 48. Notably, the Army used similar reasoning in its continued 1957 pursuit of theater-support missiles when it formally requested an exception to Wilson’s restrictive policy. Chapter 5 covers this situation in detail.

28. Armacost, 48.

29. Grimwood and Strowd, “History of the Jupiter Missile System,” 8.

30. Grimwood and Strowd, 7.

31. Grimwood and Strowd, 7.

32. Grimwood and Strowd, 10.

33. Grimwood and Strowd, 10–11.

34. Grimwood and Strowd, 11.

35. Grimwood and Strowd, 10.

36. Grimwood and Strowd, 11.

37. Grimwood and Strowd, 11.

38. Department of Defense, “Report on the Department of Defense Intercontinental Ballistic Missile and Intermediate Range Ballistic Missile Programs, November 30, 1955,” in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 161–66, <https://history.state.gov/historicaldocuments/frus1955-57v19/d44>.

39. Department of Defense, 162–63.

40. Max Rosenberg, “Plans and Policies for the Ballistic Missile Initial Operational Capability Program” (Declassified Government Report, USAF Historical Division Liaison Office, Washington, DC, February 1960), 23, <https://media.defense.gov/2011/Mar/21/2001330258/-1/-1/0/AFD-110321-028.pdf>.

41. Department of Defense, “Report on the Department of Defense Intercontinental Ballistic Missile and Intermediate Range Ballistic Missile Programs,” 162–63.

42. Department of Defense, 163.

43. Department of Defense, 163–65.

44. S. Everett Gleason, "Memorandum of Discussion at the 266th Meeting of the National Security Council, Washington, November 15, 1955," in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 146, <https://history.state.gov/historicaldocuments/frus1955-57v19/d40>.

45. Gleason, 148.

46. S. Everett Gleason, "Memorandum of Discussion at the 268th Meeting of the National Security Council, Camp David, Maryland, December 1, 1955," in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 169, <https://history.state.gov/historicaldocuments/frus1955-57v19/d45>.

47. Gleason, 170.

48. Eisenhower, *Mandate for Change*, 457. Notably, President Eisenhower understood an IRBM's definition as a missile with ranges between 1,200 and 1,500 miles.

49. Gleason, "Memorandum of Discussion at the 268th Meeting of the National Security Council, Camp David," 170.

50. Richard Damm, "James Killian, the Technological Capabilities Panel, and the Emergence of President Eisenhower's 'Scientific-Technological Elite,'" *Diplomatic History* 24, no. 1 (Winter 2000): 69.

51. Watson, *Into the Missile Age*, 164.

52. Grimwood and Strowd, "History of the Jupiter Missile System," 32.

53. Grimwood and Strowd, 32–35.

54. Watson, *Into the Missile Age*, 162.

55. Grimwood and Strowd, "History of the Jupiter Missile System," 126.

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Chapter 5 The Aftermath

Although Secretary of Defense Charles Wilson established a clear Department of Defense (DoD) policy in 1956 regarding missile development, the Army continued to fight for theater-support missiles—an operational need the service established in 1950 that envisioned ranges up to 750 miles. Additionally, although Wilson's actions ended the intermediate-range ballistic missile (IRBM) race, President Dwight Eisenhower and the DoD had to face the consequences of the short-lived effort. To shed light on the aftermath of the DoD's management of missiles, this chapter analyzes the Army's 1957 efforts to create an exception to the missile-development policy then examines how the effort duplication impacted the DoD.

The Army Fights Back: Pursuing Theater-Support Missiles

In the summer of 1957, Wilson publicly reinforced his stance restricting Army missile programs. The service subsequently enlisted Eisenhower's help to gain approval to extend the Redstone missile's range.¹ The president described the situation in a 5 August 1957 diary entry:

The Army . . . requested authority to introduce a solid propellant which it is alleged would give the missile an effective range of 400 to 500 miles (not 800 as alleged in the question directed to Mr. Wilson). The Army also states that its plan would be to use this weapon to get greater flexibility, but dependent completely upon the Air Force for reconnaissance necessary to report targets and results of findings. . . . Actually, the whole proposition seems sensible to me, particularly in that development costs would be limited to modification for the change in fuel. I suggested that the Chief of Staff seek an appointment at once with the Secretary of Defense, telling the Secretary that he was doing so at my instruction.²

Eisenhower shared these thoughts with General Maxwell Taylor and hosted numerous meetings over the next few weeks to discuss the Army's desire to exceed its 200-mile restriction.

On 12 August 1957, Eisenhower met with senior defense officials regarding the Army's desire to acquire a theater-support missile. Military history professor Gates Brown comments: "President Eisenhower was sympathetic to Army leader's arguments concerning the need for longer range missiles."³ During this meeting, Secretary of the Army Wilbur

Brucker and General Lyman Lemnitzer argued that the Army had a “definite need for a missile of the 500-mile range, not so much to reach out into the enemy territory as to provide security for the missile itself by placing it well to the rear to fire in support of frontline troops.”⁴ Eisenhower conceded that the DoD was responsible for weapons system planning and evaluation decisions but urged requirements be based on operational needs: “No service should feel that it is restricted within a rigid range ceiling.”⁵ He also acknowledged the Air Force’s lack of emphasis on tactical air support and the potential that missiles provided to the Army when Air Force support was not available.⁶ While the issue was not fully resolved at the meeting, the president clearly supported the Army’s new missile endeavor.

Eisenhower and Wilson’s conversations regarding Army theater-support missiles continued over the next few months, but the matter was not resolved until after Wilson left office. On 14 October 1957, in one of the president’s first meetings with newly appointed Secretary of Defense Neil McElroy, the leaders agreed to let the Army move forward with its new missile.⁷ Wilson’s restrictions had not considered the Army’s assessed and articulated battlefield requirements; as a result, the Army had continually questioned the policy. Eisenhower’s leadership style was to allow the defense secretary to make decisions; the president was reluctant to overrule those decisions. Additionally, while not a vague policy like its predecessors, the 1956 missile policy underscored the difficulty of managing emerging, and continually maturing, technology. Nevertheless, the IRBM effort duplication—though short-lived—had consequences.

The Cost of Duplication

Missile development in the 1950s is an easily identifiable example of effort duplication, a situation epitomized by the 1956 multi-service pursuit of IRBMs. While the DoD’s minimal restriction approach intensified inter-service competition, it also led to rapid development of emerging technology. Brown, for example, argues that “the competition between the Army and the Air Force made the US IRBM program better.”⁸ Similarly, former US ambassador Michael Armacost comments:

If a technical problem urgently demands a solution, duplicative efforts may be warranted in order to accelerate this learning process. . . . Where military problems urgently demand solution, the support of parallel development programs may constitute a defensible method of overcoming technical difficulties.⁹

Nonetheless, while duplicative efforts may have expedited missile innovations, the intense competition between the Army and the Air Force created

serious issues for the DoD. For analysis purposes, these issues fit into three categories: economic, opportunity cost, and unintended consequences.

First and foremost, missile effort duplication was not in line with Eisenhower’s fiscally conservative approach for the military; multiple services spending money on comparable projects strained the limited defense budget. In fact, 1955 and 1956 missile spending represented 20 percent of the defense budget—twice the amount Wilson considered sustainable.¹⁰ Wilson complained to the president at a March 1956 National Security Council meeting that the IRBM race was making it “very difficult” to maintain Defense Department Fiscal Year 1956 estimated levels, adding that the services “were spending a very great deal on research and development,” resulting in a continuing demand for funds.¹¹ Effort duplication caused missile expenditures to grow exponentially, and the DoD predicted the costs would continue to rise at an unmanageable rate (see Figure 5.1). Wilson warned Eisenhower that Defense Department total expenditures would be higher than forecast and would increase for 1958, 1959, and 1960.¹²

	1956–1957 (in millions)	1958–1963 (in millions)
Missile Spending	Actual: \$11.8	Projected: \$36.1

Figure 5.1. Missile Expenditures and Five-Year Forecast.

Source: Created by the author from S. Everett Gleason, “Memorandum of Discussion at the 329th Meeting of the National Security Council, Washington, July 3, 1957: U.S. Ballistic and Non-Ballistic Missiles Program,” in *Foreign Relations of the United States, 1955–1957, National Security Policy*, vol. 19 (Washington, DC: United States Government Printing Office, 1990), 536, <https://history.state.gov/historicaldocuments/frus1955-57v19/d126>.

These increased expenditures created a grim outlook for future modernization efforts, with missile research and testing demands financially hampering long-term DoD objectives. Donald Quarles—recently elevated to deputy secretary of defense—commented: “The resources of the United States would be insufficient to support all these [missile development] programs.”¹³ Wilson argued that the United States could not afford to spend more than 10 percent of its budget on missiles.¹⁴ Express-

ing similar frustrations, Eisenhower contended that numerous missiles “resemble one another quite markedly in their capabilities,” adding that the DoD needed to eliminate programs.¹⁵ Responding to the economic strain, the president explained that the country was headed to a “garrison state,” warning that if expenditures were “allowed to run too high, the result would be to ruin the America we know.”¹⁶ Ultimately, despite the side effect of rapid technological advancement, effort duplication was economically unsustainable—not only in dollars spent, but also in missed opportunities across the services. Modernization choices need to account for the next-best use of resources.

In essence, extra missile development expenditures within the constrained budget were an opportunity cost to other capabilities, which impacted all three services. For example, in March 1956, Chief of Naval Operations Admiral Arleigh Burke discussed his concerns about declining sonar research with the president.¹⁷ The following month, Wilson pressured the Air Force to reassess its organizational requirements and dramatically reduce the number of aircraft it required to accomplish its assigned service functions.¹⁸ For the Army, missile development—particularly for a weapon it would not employ—exhausted research and development funds, limiting its funds to modernize more conventional capabilities. Walter Kretchik, Western Illinois history professor, describes the Army funding disparity and associated opportunity cost:

Tactical nuclear weapons research and development consumed service funds at an alarming rate and other equipment suffered for it. In 1957 alone, nearly half of the service’s research and development budget went toward missiles and nuclear weapons compared with 4.5 percent for new vehicles, 4.3 percent for artillery, and 4 percent for aircraft.¹⁹

Additionally, this financial strain influenced manning policy; while discussing planned military programs in July 1957, Eisenhower acknowledged inevitable Army and Marine Corps personnel reductions: “In order to develop missiles, we must make reductions somewhere.”²⁰ On top of directly measurable impacts, this effort duplication had unintended consequences that were difficult to quantify.

In addition to the financial issues created by effort duplication, public competition for IRBMs eroded the already tenuous relationship between the Army and Air Force. This relationship strain had strategic implications because the services are inherently joint in their operations; the Army relies on the Air Force for movement and close-air support. When Eisenhower sat down with the Joint Chiefs of Staff (JCS) in March 1956, JCS

Chairman Admiral Arthur Radford started the conversation by noting “that unless brought under control, a situation may develop in which the Services are involved in increasing public disagreement among themselves.”²¹ Radford was concerned about the Army’s “increasingly aggressive public relations policy” and feared the other services would soon follow suit.²² Eisenhower expressed similar concerns about effort redundancy, directing the services to end what he termed “competitive publicity,” explaining that “it was highly harmful to the Nation.”²³

Although Wilson clarified missile development and operational responsibility—and the Army was no longer authorized to operate it—the Jupiter missile project continued. Historian Robert Watson indicates the restrictions “dealt a shattering blow to morale at Redstone Arsenal. Army missile experts were now devoting their efforts to a weapon that, if it succeeded, must be surrendered to another service.”²⁴ Essentially, the Army continued to dedicate a large portion of its budget to a project it no longer owned, even though the new restrictions prevented it from using its facilities or manpower to pursue other missile projects.

Having the Army as the obvious loser in the public IRBM race also created a potentially devastating issue for esprit de corps. While discussing the inter-service IRBM resolution in August 1957, Eisenhower told Wilson: “From the way it is being handled in the press, it will appear that the Army and the Air Force are in a cat and dog fight over possession of the missile, with the Air Force emerging winner.”²⁵ Wilson agreed, adding that morale issues could affect “the entire future ballistic missile mission.”²⁶ Though the DoD made short-term progress on two distinct IRBM projects, one long-term cost was a fractured relationship between the two interdependent services.

Although the missile race generally subsided after 1957, the relationship between the Army and Air Force remained strained into Eisenhower’s second term, particularly regarding the Air Force’s responsibility to provide the Army with close-air support. In fact, this tension led Army Chief of Staff General Lyman Lemnitzer to initiate a 1959 study to create a contingency plan for assuming the responsibility of tactical air support missions, eventually leading the Army to challenge numerous service-function restrictions established by Secretary Wilson.²⁷ In the report, the Army claimed the Air Force had neglected its support mission in numerous ways, pushing the Army toward independence.²⁸ Retired Air Force Col. and former George Washington University history professor John Schlight analyzes the rift between the two services, explaining that the Army desired “modification of the currently assigned roles and mis-

sion to allow the Army to develop ‘organic systems’ it deemed necessary for land operations.”²⁹ While missile-development responsibilities were not the only contentious issues between the services, the public and aggressive contests over IRBM jurisdictional assignment negatively affected the relationship.

Conclusion

The Army’s continual pursuit of theater-support missiles in direct conflict with the 1956 missile-development policy brought to the forefront the challenges and fluidity of managing emerging technology. In sum, maturing missile technology—including warhead miniaturization and solid fuel developments—provided the Army the necessary catalyst to request that the DoD reevaluate its missile policies. Even a straightforward policy that leaves little room for interpretation needs to be continually reassessed to keep pace with changing technology and battlefield implications.

While Wilson put an end to missile effort redundancy, the earlier competition had already caused problems. Although effort duplication may have increased the speed at which the services developed IRBMs in 1956, the consequences were keenly felt over the next few years. The inherent challenge for emerging technology management is to balance the rewards of competition against the risks of economic waste and strained inter-service relationships.

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Chapter 6 Conclusion

From 1947 to 1956, President Harry Truman, President Dwight Eisenhower, Congress, and the Department of Defense (DoD) established and adapted service functions to create a military unity of effort and maximize the dwindling defense budget. The analysis in the previous chapters demonstrates how missile development—the emerging technology of the time—challenged the DoD’s ability to mitigate inter-service competition and unnecessary duplication of effort. While the Army’s pursuit of the Jupiter missile was the focus of the research, the overarching purpose of this study was to understand how service functions can be adapted to effectively manage emerging technology.

Jupiter Missile Implications and Emerging Technology

While numerous factors contributed to the Army’s Jupiter missile pursuit, this book was scoped to assess the impact of service functions—both enduring land-combat responsibilities and specific missile-development restrictions. Additionally, while indirect and abstract motivations undoubtedly drove Army decisions, this study focused exclusively on Jupiter’s battlefield application. The subsequent analysis demonstrates the Army took advantage of the imprecise wording in the 1954 missile agreement, and then applied its land-combat function broadly to justify developing an intermediate-range ballistic missile (IRBM). While the Army ably articulated the potential for long-range missiles in a future conflict, the service failed to justify jurisdictional missile responsibility that extended beyond a few hundred miles, which was well short of the Jupiter missile range. Without an operational need, the Army’s Jupiter missile pursuit serves as an example of a service betting on immature technology and capitalizing on a development opportunity to compete for finite and shrinking resources. In the Jupiter situation, the DoD faced three clear challenges: to manage emerging technology, delineate development responsibility, and deal with ambiguity.

Service Functions and Emerging Technology

Above all, established service functions did not account for missile development, which forced continual adaptations and corollary agreements across the board—important but not surprising. The initial codification of service functions and subsequent adjustments at the Key West and Newport conferences provided the framework for the services to man, train, and equip. Yet the DoD had limited ability to account for immature

technology or predict the impact that emerging capabilities could have on the battlefield. While not the only 1950s emerging technology, missiles illuminated DoD challenges with mitigating duplicative efforts. Consequently, the DoD needed to update service functions through conferences, Joint Chiefs of Staff (JCS) proposals, and directive policy.

At the time, jurisdictional assignment for missiles was not obvious. While not profound, this point is fundamental to understanding how service functions are developed to manage emerging technology; for example, more than one service could have legitimate and distinct operational requirements for new technology. Specifically, both the Navy and the Air Force required aircraft to accomplish their primary missions, but the extent to which they needed the technology was quite different. Similarly, missiles were a viable tool for all the services in different and unique ways. By its very nature, emerging technology does not fit easily into established service functions. The DoD should assess new capabilities regularly to maximize potential and avoid expensive effort duplication.

Delineating Responsibility and the JCS

Throughout the missile competition, service representatives were generally parochial. In turn, JCS members and service-based committee members failed to subordinate their individual service interests to efficiently address missile-development responsibilities. However, it is not surprising that service representatives were hesitant to agree to limitations regarding emerging technology development. Any missile research and development restriction—even if temporary—could prevent the service from unlocking an immature technology’s unforeseen potential. Even with the best intentions, the JCS, by its nature, could only reach agreements through consensus or after being adjudicated by the secretary of defense. Regarding the secretary of defense, Wilson was reluctant to make controversial decisions. In turn, the consensus-based approach limited the effectiveness of the two JCS missile agreements. Both included non-specific language, which provoked contentious overlap.

This approach to delineating responsibility raises questions regarding whether the services can resolve contentious issues internally. While the JCS representatives are the respective subject matter experts for assessing operational service requirements, they cannot be expected to subordinate their own interests. In the competition for limited resources, the services are inherently bureaucratic organizations. While none of the service chiefs openly undermined DoD policy with their missile pursuits, their respective service interests took priority. Even when the services agreed on the need

to eliminate effort duplication, consensus-based agreements—a byproduct of an organization of equals—still fostered ambiguity that the services exploited. For example, the chiefs proclaimed in their 1950 missile agreement that “undesirable duplication in research and development should be avoided;” just three years later, however, all three services were developing comparable systems—Redstone, Matador, and Regulus.¹ While the JCS can provide the necessary context to delineate responsibility by assessing operational requirements, the effective application must come from a centralized authority.

Essentially, the 1950, 1954, and 1956 missile-restriction policies spotlight the JCS’s limited ability to resolve internal service issues. Contextually, the JCS created the 1950 and 1954 missile-development agreements, contributing to the continued use of ambiguous language. In contrast, Secretary Wilson’s 1956 missile restrictions efficiently delineated development responsibilities—even if the Army leadership was disappointed with the outcome.

Ambiguous Wording Opens the Door for Duplication

Ambiguous language in the 1950 and 1954 missile-development agreements enabled the services to interpret their restrictions broadly, resulting in duplicative efforts and capabilities. For example, in 1950, the JCS assigned the Army missiles “which supplement or extend the capabilities” of artillery but did not define to what extent the Army could extend artillery ranges.² Subsequently, the Army assessed its operational needs and capitalized on the undefined term, establishing artillery requirements up to 750 miles.³ This significant capability leap was more than thirty times the range of the cannons that the missiles were intended to replace. Not inconsequentially, the Army’s operational assessment then created tension among the services; the Army and Air Force had drastically different interpretations of the 1950 missile agreement’s imprecise wording. The 1953 Regulus missile controversy illustrates these varying service interpretations, which directly led to a reevaluation of service functions.

The 1954 missile agreement, like its predecessor, was littered with less than specific phrasing. The JCS restricted the Army—with Army Chief of Staff General Matthew Ridgway in agreement—to surface-to-surface missile development explicitly “for use against tactical targets within the zone of Army combat operations” but did not define the tactical targets or the range.⁴ The Army was again free to define the terms for itself. By continually redefining its vision of the future battlefield and liberally applying its zone within it, the Army stretched the intent of the

1954 agreement and interpreted the restrictions to meet its own needs. Simply put, ambiguous wording enabled the Army's Jupiter missile pursuit, an accepted effort duplication. Strikingly, service function overlap and emerging technology management are enduring problems that continue to impact military formations.

Service Functions: A Modern Problem

Lessons from the initial development of service functions are not isolated to the 1950s. For example, the Intermediate Nuclear Forces (INF) Treaty's 2019 demise created a military innovation opportunity, albeit a contentious one.⁵ In addition to ending missile development restrictions, the 2018 National Defense Strategy codified the US strategic shift to Great Power Competition, driving the services to prepare for a near-peer threat.⁶ To support this shift, the Army began modernizing for large-scale combat operations, and Secretary of the Army Ryan McCarthy identified "long-range precision fires" as the service's top developmental priority.⁷ This combination of treaty termination, strategic realignment, and Army modernization priorities set the stage for a new missile-development era reminiscent of the 1950s. Just as competition influenced 1950s IRBM development, modern missile development will have inter-service implications.

As it begins post-INF Treaty missile development, the Army may challenge the accepted inter-service norms identified in this case study. A July 2020 article by retired Air Force Lt. Gen. David Deptula revived the seventy-year-old debate regarding service responsibilities. He described the Army's decision to invest in INF-range missiles as "ridiculous," noting that it encroaches on Air Force roles and missions.⁸ The retired general is a strong advocate for service function clarification, even testifying on the topic in 2015 to the US Senate Armed Services Committee while serving as the dean of the Mitchell Institute for Aerospace Studies. In his testimony, Deptula called attention to the strategic implications of poorly defined service functions and inter-service competition, particularly when assessing capability needs.⁹

A week after *Breaking Defense* published Deptula's comments on Army missile-development plans, Brig. Gen. John Rafferty, director of the Long Range Precision Fires Cross-Functional Team, US Army Futures Command, described the Army's missile development program as complementary: "There's always going to be competition for resources, but I don't think this one is about roles and missions."¹⁰ Instead, Rafferty contended "the race is against a pacing threat."¹¹ Both flag-grade officers alluded to services roles established in the 1950s. As innovation regarding

INF-noncompliant missiles begins, inter-service competition will play a significant role in the development of this resurgent capability.

In February 2021, concerns regarding service function clarity resurfaced at the JCS level. Air Force Chief of Staff General Charles Brown challenged the DoD to reassess roles and missions for All Domain Operations, the new joint-warfighting concept.¹² Brown explained that while service functions do not require an overhaul, “there needs to be better delineation of responsibility for joint long-range fires, joint command, and control and logistics protection missions.”¹³ This conversation escalated the next month when Air Force General Timothy Ray, Air Force Global Strike Command leader, criticized the Army’s missile development plans: “I just think it’s a stupid idea to go and invest that kind of money that recreates something that the service has mastered and that we’re doing already right now. Why in the world would you try that?”¹⁴ While renewed interest in missile development tops the list of potentially contentious issues, the services will face implications far beyond missiles. Importantly, and in line with findings of this study, Brown concedes: “Only Defense Secretary Lloyd Austin can really make the call to undertake any review of specific mission sets, and institute changes.”¹⁵ A reassessment of service functions is needed as the services look to future operations and incorporating emerging technology such as cyber, space, and artificial intelligence.

Enduring Findings and Recommendations

This analysis raises questions about the adaptability of service functions and the challenges associated with emerging technology. Among questions that merit further research, especially regarding modern service function issues:

- What are the Army’s operational long-range fire requirements in support of the envisioned All Domain Operations joint warfighting effort?
- Given the secretary of defense turnover rate, how does the near-absolute authority over service functions impact the United States’ ability to conduct long-term (ten to fifteen years) modernization efforts?
- What are the potential consequences of duplicate effort regarding current emerging technology such as cyber warfare, and do they outweigh the potential benefits of developing this immature capability?
- What are the feasibility and strategic implications of stationing post-INF Treaty IRBMs in Europe or Asia?

While the research in this book is historical, five distinct findings apply for emerging-technology management. First, emerging technology by its very nature will require continuous policy updates because it does not fit established functions. To manage this uncertainty, the services must assess and articulate their respective operational needs, especially as technology matures in tandem with battlefield implications. To support these updates, the services should organize conferences that mirror the Key West and Newport gatherings. If the secretary of defense only conducts service function reviews to mediate conflict or adjudicate contentious issues, these sessions will be combative rather than cooperative. Instead, in-depth service function reviews should be conducted regularly, either event- or time-driven. For example, the DoD could conduct a conference every other summer—during a JCS changeover, when a new National Security Strategy is published, or after a change of administration or defense secretary.

Second, this study illuminates that the JCS is not an effective decision-making organization regarding issues that limit the services; the pull to service interests is inexorable for the service chiefs. To be effective, developmental responsibility for emerging technology must come from a central authority such as the Office of the Secretary of Defense. Contrary to the challenges that Secretaries James Forrestal, Louis Johnson, and Wilson faced, the current DoD has a substantial staff to manage emerging technology development. Consequently, the Office of the Secretary of Defense should assign an assistant secretary to track, manage, and assess the development and impact of emerging technology on the battlefield—and continually provide updates to service functions for review and eventual discussion at JCS conferences mirroring the Key West conference.

Third, as previously established, ambiguous language in DoD policies and directives promotes misunderstanding. Service leaders are likely to interpret unclear language based solely on their professional experience—and often in self-interested ways. Even if the JCS agrees on intent, unclear verbiage in a policy will cause issues for service chiefs—positions with inherently high turnover. The DoD should use clear language and define terms that do not already have joint definitions. In the Key West Agreement, Forrestal included a glossary of terms to avoid confusion. For mature technology such as missiles, delineation of development and employment responsibility should be unambiguous; categorizing missile types by range would be an example. For more immature technology like cyber, verbiage should be openly inclusive—accepting and promoting effort duplication—or clearly restrictive. The DoD must provide clarity.

Fourth, effort duplication is a double-edged sword—a balance of risk and reward. While there are immediate technological benefits when numerous organizations work on the same problem, such situations also involve economic trade-offs and the potential for unintended consequences. The DoD must analyze potential secondary and tertiary impacts such as effort redundancy and the probability that competing nations will realize the potential of new technology before the United States does. To manage effort duplication, the DoD should use research organizations such as RAND to assess the battlefield implications of emerging technology, including cyber and artificial intelligence.

Finally, upgrading current systems is less contentious and generally more efficient than developing new ones. Army Chief of Staff General Matthew Ridgway used this logic in 1955 when he opposed the Army's IRBM pursuit, pushing instead to increase the range of its Redstone missile to avoid a confrontation with the Air Force. Similarly, one key reason Eisenhower supported the Army's 1957 theater-support missile policy exemption was that integrating solid fuel would enhance an already developed missile system—with minimal financial impact. Before creating any new post-INF missile platforms, the Army should maximize its current missile delivery platforms—Multiple Launch Rocket System and the High Mobility Army Rocket System—to meet long-range fire requirements.

Overall, this study of the Army's Jupiter missile pursuit assessed DoD challenges with missile-development. While Great Power Competition is by no means a second Cold War, the US military is again competing with growing and resurgent powers. This analysis clearly applies to the current situation. Similar to the findings of this research, Deptula warned the Senate Armed Forces Committee: "A dollar spent on duplicative capability comes at the expense of essential capacity or capability elsewhere. . . . Security circumstances and fiscal pressures will no longer tolerate such conditions."¹⁶ To thrive in this complex new environment, the United States cannot afford inefficient modernization practices. Even so, it must capitalize on yet-unforeseen capabilities of immature technology. Creating this balance is the enduring challenge for emerging technology management. Such efforts must be proactive, led by a central authority, and free of ambiguous language.

Notes

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2. US Secretary of Defense, 210.

3. John Bullard, “History of the Redstone Missile System” (historical monograph, Historical Division, Army Missile Command, Redstone Arsenal, AL, 15 October 1965), 22, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a434109.pdf>.

4. Robert Watson, *The Joint Chiefs of Staff and National Policy 1953–1954*, History of the Joint Chiefs of Staff, vol. 5 (Washington, DC: Office of Joint History, Office of the Chairman of the Joint Chiefs of Staff, 1998), 185.

5. Michael Pompeo, “U.S. Withdrawal from the INF Treaty on August 2, 2019,” US Department of State, 2 August 2019, <https://www.state.gov/u-s-withdrawal-from-the-inf-treaty-on-august-2-2019/>.

6. US Secretary of Defense, *Summary of the 2018 National Defense Strategy of The United States of America: Sharpening the American Military’s Competitive Edge* (Washington, DC: Department of Defense, 2018), <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.

7. Chief of Staff of the Army and Secretary of the Army, “Modernization Priorities for the United States Army” (Official Memorandum, Washington, DC: Department of the Army, 2017), <https://admin.govexec.com/media/untitled.pdf>.

8. Theresa Hitchens, “Long-Range All-Domain Prompts Roles & Missions Debate,” *Breaking Defense* (blog), 9 July 2020, <https://breakingdefense.com/2020/07/long-range-all-domain-prompts-roles-missions-debate/>.

9. David Deptula, “Revisiting the Roles and Missions of the Armed Forces,” Statement Before the Senate Armed Services Committee on Roles and Missions of the Armed Services (Washington, DC: Senate Armed Services Committee, 5 November 2015), https://www.armed-services.senate.gov/imo/media/doc/Deptula_11-05-15.pdf.

10. Sydney Freedberg, “Army Says Long Range Missiles Will Help Air Force, Not Compete,” *Breaking Defense* (blog), 16 July 2020, <https://breaking-defense.com/2020/07/army-says-long-range-missiles-will-help-air-force-not-compete/>.

11. Freedberg.

12. Theresa Hitchens, “Roles & Missions Scrub Needed for All Domain Ops: CSAF Brown,” *Breaking Defense* (blog), 18 February 2021, <https://breakingdefense.com/2021/02/roles-missions-scrub-needed-for-all-domain-ops-csaf-brown/>.

13. Hitchens.

14. Valerie Insinna, “Air Force General Says of Army’s Long Range Precision Fires Goal: ‘It’s Stupid,’” *Military Times*, 2 April 2021, <https://www.defensenews.com/air/2021/04/02/air-force-general-says-of-armys-long-range-precision-fires-goal-its-stupid/>.

15. Hitchens, “Roles & Missions Scrub Needed for All Domain Ops.”

16. Deptula, “Revisiting the Roles and Missions of the Armed Forces,” 1.

Appendix Pre-Jupiter Army Missiles

Before pursuing the Jupiter intermediate-range ballistic missile (IRBM), the Army began developing missiles for its three support-based requirements. These are delineated by range and categorized as short, medium, and long. Central to this study is the Army's first attempt at a long-range—theater support—missile known as the Redstone. This appendix describes the Army's first three missile projects to provide necessary context for understanding the service's technical capabilities and limitations regarding 1950s missile development.

The Army's short-range missile type, which mirrored artillery capabilities of the time, was uncontroversial in terms of inter-service missile competition. The Army designed these missiles to support corps operations, intending them to have a range from five to thirty-five miles.¹ The service eventually produced numerous missiles in this category to provide



Figure A.1. The Honest John Missile.

Source: US Army Aviation and Missile Life Cycle Management Command, "Honest John," Government, Redstone Arsenal Historical Information, accessed 6 February 2021, <https://history.redstone.army.mil/miss-honestjohn.html>.

a nuclear capability to the lowest-level commander.² In May 1950, the Army Chief of Ordnance Maj. Gen. Elbert Ford ordered the Redstone Arsenal development team to conduct “a preliminary design study of a special purpose, large-caliber field artillery rocket.”³ In June 1951, the Redstone Arsenal team conducted numerous test-fire demonstrations; by the end of the summer, Secretary of the Army Frank Pace approved full-scale production of the Army’s first short-range missile—the Honest John.⁴

The Army rapidly designed the Honest John and successfully equipped units with the new system in 1954.⁵ Military historian Janice McKenney describes the earliest Honest Johns as “hastily improvised weapons to augment existing artillery when ammunition problems in Korea were still acute and when the threat from the Soviet Union seemed particularly great.”⁶ With a maximum range of only sixteen miles—upgraded to twenty-five miles in 1961—the Honest John was an example of the Army supplementing or replacing current artillery systems.⁷ Thus, the Honest John met the intent of the 1950 missile responsibility memorandum.

In contrast to the Honest John, the Army’s medium-range missile type dramatically extended the service’s organic strike capability. The first of these medium-range missiles—the Corporal—was the product of the Army’s first experiments with missile technology. From 1949 to 1951, the Redstone Arsenal team conducted extensive Corporal missile flight tests, demonstrating the Army’s technical missile ability.⁸ The Redstone Arsenal team measured early test errors in miles; by June 1953, after firing more than fifty tests, the missiles achieved accuracy within 100 meters.⁹ The missile was a significant accomplishment and spoke to the Army’s technical prowess. The Army intended to create sixteen Corporal battalions by the summer of 1954; however, the service did not field the medium-range missile until 1955.¹⁰

Once developed, the Corporal ballistic missile had a range from twenty-five to seventy-five miles.¹¹ The Corporal’s range did not mirror conventional artillery capabilities but also did not encroach on the Air Force’s presumed missions—conducted by either aircraft or Air Force missiles. Despite this fact, McKenney explains numerous operational challenges limited the new missile’s utility:

The liquid-fueled Corporal was susceptible to countermeasures, requiring many items of specialized ground equipment and a correspondingly large number of personnel; its mobility was poor and its fueling process slow; and the intervening time between target assignment and actual firing was excessive.¹²



Figure A.2. The Corporal Missile.

Source: US Army Aviation and Missile Life Cycle Management Command, “Corporal,” Government, Redstone Arsenal Historical Information, accessed 6 February 2021, <https://history.redstone.army.mil/miss-corporal.html>.

Additionally, the forty-five-foot missile was easily identified on the battlefield, had a large firing signature, and was not able to defend itself.¹³ While the Army’s first ballistic missile had tactical potential, it also identified new problems that the Army had to overcome to employ them successfully. For example, a significant range increase could solve many of these problems, reinforcing the notion of an Army long-range missile program.

The Army’s first missile to potentially infringe on the Air Force mission of interdiction was the Redstone missile. The Army began developing the Redstone missile in the summer of 1951, with a goal range of 500 miles.¹⁴ Military historian John Bullard explains that the Army designed the Redstone to “supplement and extend the range or firepower of the existing artillery and shorter-range missiles, to provide increased support for deployed ground combat forces, and to compensate for the expanding

dimensions of the battle area.”¹⁵ The Army conducted its first Redstone test flight in August 1953; although there was a control system malfunction, a successful follow-up test in January 1954 demonstrated the new missile’s potential.¹⁶

However, the Redstone missile did not reach the Army’s intended goal range of 500 miles. Instead, it had a reduced maximum range of 175 miles. While the Army did not deploy the missile until 1958, successful early 1950s testing proved the concept and, just like the Corporal, demonstrated the service’s technical capacity to create missiles.¹⁷ In fact, this testing set the foundation for the entire Army missile program over the next two decades. As Bullard notes, the Army “used the Redstone to prove or disprove concepts and techniques that created a store of information they used in developing the Jupiter, Pershing, Honest John, Littlejohn, and Sergeant missile systems.”¹⁸ Accordingly, the experience gained developing the Redstone missile set the groundwork for the Army’s pursuit of the Jupiter missile, both in scientific knowledge and eventually in the repurposing of parts.



Figure A.3. The Redstone Missile.

Source: US Army Aviation and Missile Life Cycle Management Command, “Redstone,” Government, Redstone Arsenal Historical Information, accessed 8 February 2021, <https://history.redstone.army.mil/miss-redstone.html>.

Notes

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3. US Army Aviation and Missile Life Cycle Management Command, "Honest John," Redstone Arsenal Historical Information, accessed 6 February 2021, <https://history.redstone.army.mil/miss-honestjohn.html>.
4. US Army Aviation and Missile Life Cycle Management Command.
5. US Army Aviation and Missile Life Cycle Management Command.
6. McKenney, *The Organizational History of Field Artillery 1775–2003*, 212.
7. McKenney, 241.
8. James Bragg, "Development of the Corporal: The Embryo of the Army Missile Program," Declassified Government Report (Reports and Historical Branch Control Office, Army Ballistic Missile Agency: Redstone Arsenal, AL, August 1971), 118–26, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a586733.pdf>.
9. Bragg, 133.
10. McKenney, *The Organizational History of Field Artillery 1775–2003*, 214.
11. McKenney, 214.
12. McKenney, 214.
13. McKenney, 214–15.
14. Bullard, "History of the Redstone Missile System," 49–50.
15. Bullard, 95–96.
16. Bullard, 162–64.
17. McKenney, *The Organizational History of Field Artillery 1775–2003*, 241.
18. Bullard, "History of the Redstone Missile System," 139.

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