**The Dissertation Committee for Ryan C. Kendall Certifies that this is the approved version of the following Dissertation:**

# Playing War: US Military Experimentation and Innovation During Peacetime

**Committee:**

Jeremi Suri, Supervisor

Sheena Chestnut Greitens

Bruce Hunt

William Inboden

Stephen Rosen

# Playing War: US Military Experimentation and Innovation During Peacetime

**by**

**Ryan C. Kendall**

**Dissertation**

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

**Doctor of Philosophy**

**The University of Texas at Austin**

**May 2022**

## Dedication

To my wife, Shannon, and three children, Aidan, Hudson, and Marin. May we never stop seeking answers to our questions. I love you all so much.

To Mum and Dad, thank you for always being in my corner. I love you both.

## Disclaimer

The views expressed in this dissertation are those of the author and do not reflect the official policy of the Department of the Army, the Department of Defense, or the US government. All errors are the sole responsibility of the author.

## Acknowledgements

> I'm a success today because I had a friend who believed in me, and I didn't have the heart to let him down.
>
> Abraham Lincoln

Writing a dissertation is a team sport. Although on the surface, it is an individual endeavor that can be extremely isolating at times, my experience has been that it requires significant help from others. No one has been a larger part of this team effort than my family. From the moment my wife, Shannon, and I spoke about my applying for the Advanced Strategic Planning and Policy Program to the completion of this dissertation, my family has been at the center of this experience. They have provided the encouragement that I did not realize I needed and, at times, completely reworked their life schedules to support my research. They have learned more about peacetime military experimentation than they ever wanted, and they have been there with me every step of the way. I do not know how I would have completed this without their continuous love, support, and patience. I am forever in their debt.

My interest in higher education did not suddenly develop in recent years. Instead, my interest in a lifetime of learning comes from my parents, Russ and Linda Kendall. Throughout my childhood and into my adult years, my parents have always encouraged me to seek new experiences, new educational opportunities, and to do so with an eye toward continued public service. In addition, my parents taught me the importance of learning from history from an early age, something that I have thoroughly enjoyed applying to this dissertation. I am thankful for their love, support, and endless optimism about my potential.

I am grateful that I was lucky enough to end up at the LBJ School. I have benefitted from the unbelievable cast of scholars and practitioners that make the LBJ School so unique,

both within the faculty and within the graduate students. My fellow LBJ Ph.D. cohort has been a tremendous wealth of support, ideas, and laughter during what has been a unique experience. The University of Texas community has provided me access to a seemingly endless supply of leading experts, many of whom invested considerable time in my development. From this cast, I have benefited the most from my committee members. Each one has been patient and understanding with my timeline and provided feedback that significantly improved the quality of my work. Their generosity with their time, their willingness to listen to me think out loud, and the personal interest they all took in my development have made this one of the most enriching personal and professional experiences of my career.

Before I even began my research, I benefitted from the assistance of so many people. Major General Charlie Miller, Dr. Gail Yoshitani, and Dr. Sue Bryant were kind enough to write letters of recommendation while also providing their own experiences as Ph.D. students to help guide my research and manage my expectations. Additionally, several leaders have been instrumental in helping me pursue this goal, most notably General Chris Cavoli and Lieutenant General Ron Clark.

Several scholars have played a significant role in my research for this dissertation. Throughout this experience, Dr. Jeremi Suri's counsel and mentorship have been ever-present. His class was one of the most formative learning experiences of my career, and our discussions have helped me explore aspects of this topic that I would not have considered on my own. Dr. Ben Jensen, whom I had the pleasure of serving with on the Chief of Staff of the Army's Strategic Studies Group, has been a sounding board and advocate throughout this experience. From writing letters of recommendation to helping me sort through research ideas, I have significantly benefited from his expertise and counsel. Dr. Stephen Rosen, whom I also met while serving with the Strategic Studies Group, has been the voice

of reason on multiple occasions. He has invested countless hours in my professional development, beginning with helping me apply to Ph.D. programs and as a member of my committee for the past year. Dr. Will Inboden, who was the first person I spoke with from the LBJ School, has supported my research from its inception, connecting me with a vast network of scholars and practitioners and helping me navigate my truncated timeline. Finally, I am grateful for the mentorship and support of Dr. Sheena Chestnut Greitens and Dr. Bruce Hunt, both of whom I had the pleasure of having as instructors and committee members. Both have been very generous with their time and insights and have had a significant impact on my research.

The opportunity to pursue a doctorate was made possible by the Army Strategic Planning and Policy Program (ASP3). Dr. Robert Davis, our director, has had the challenging task of herding more than 100 officers in doctorate programs throughout the US and in several foreign countries. His counsel and mentorship throughout this process made a significant difference. ASP3 would not exist had it not been for General Ray Odierno. He established this program in 2012 to educate future Army strategic leaders, and since its inception, it has enabled more than 55 officers to earn their doctorate. I had hoped to interview General Odierno for this dissertation, but unfortunately, it was not meant to be. He passed away as I was beginning my research. Nevertheless, his willingness to invest in the intellectual development of the Army enabled me to complete this dissertation at one of the most consequential points in my career. Even though I never had the opportunity to thank him personally, I will always be grateful, and I hope that my future service lives up to what he intended when he established the program.

My research would not have been possible without the assistance of countless archivists who were willing to dedicate their time to help me track down evidence. The Army Heritage and Education Center, the Center for Military History, the TRADOC historian's

office, the Combined Arms Research Library, and many others provided the archival documents that proved to be critical to my case studies. I am forever appreciative of their willingness to prioritize my work based on my shortened timeline and provide their professional experience to reduce the number of mistakes I would have otherwise made in my research approach.

Of all the things I experienced during this endeavor, the personal enjoyment and professional development of the more than 70 interviews were the most unexpected. The willingness of these people to share their very personal stories with me was overwhelming at times. They allowed me to relive their experiences with them, often with such vivid detail that I could mentally place myself within them. These interviews are what made this research so powerful for me. For most of those I spoke with, no one had contacted them before to talk about their experiences. They each placed a significant amount of trust in me to tell their story, and I hope that I have done them justice.

*Ryan C. Kendall*
*Austin, Texas*
*April 29, 2022*

## Abstract

# Playing War: US Military Experimentation and Innovation During Peacetime

Ryan C. Kendall, Ph.D.

The University of Texas at Austin, 2022

Supervisor: Jeremi Suri

The military innovation process takes on different characteristics during wartime and peacetime. Wartime innovation has the immediate feedback of the battlefield. Peacetime innovation must account for various possible futures while facing the uncertainties of imperfect information. Military innovation studies suggest that experimentation provides a tool for overcoming this challenge. Existing scholarship characterizes experimentation as an iterative learning process that generates new data about future warfare, citing historical examples such as US carrier warfare and German combined arms maneuver.

This dissertation argues that this perspective is incomplete for understanding how experimentation supports peacetime innovation. Rather than revealing the nature of future warfare, experimentation instead is most valuable as a consensus-building tool. Peacetime military experimentation is a social process within which organizations, groups, and actors influence the ideological competition within a defense policy subsystem. Social processes involve constructing knowledge and achieving consensus on beliefs of 'what is true' and 'what works.' During war, this process happens thru shared experiences on the battlefield.

During peacetime, this process happens during experimentation. Military experimentation requires senior leader sponsorship, but sponsorship alone will not build sufficient consensus within the key constituencies. To increase the probability that experimentation will lead to a transition to the implementation stage of the innovation process, defense policymakers utilize an advocacy network, a loose coalition of defense policymakers and policy influencers, to build consensus across the defense policy subsystem.

This dissertation examines these arguments within three case studies: the Army's experimentation with a motorized concept in the 1980s, the Army's New Louisiana Maneuvers and Force XXI experiments in the 1990s, and Joint Forces Command's joint experimentation of the late 1990s and early 2000s. For defense policy, this dissertation's findings suggest that defense policymakers should focus efforts on extending an advocacy network that connects experimentation to the broader defense policy subsystem to maximize experimentation's usefulness. Additionally, experimentation requires leaders who are intellectually engaged with new ideas, can communicate their value, have the credibility of operational experience, and participate in the advocacy network to connect experimentation with key groups. Finally, effective experimentation requires leaders who receive the requisite education and experiences early and often in their careers.

Table of Contents

# List of Tables

# List of Figures

# CHAPTER ONE: INTRODUCTION AND THEORY

> For the Romans did in these cases what all wise princes should do: they not only have to have regard for present troubles but also for future ones, and they have to avoid these with all their industry because, when one foresees from afar, one can easily find a remedy for them but when you wait until they come close to you, the medicine is not in time because the disease has become incurable.
>
> Niccolò Machiavelli, *The Prince*[1]

## I. Introduction

### A. THE PROBLEM

In *Hope is not a Method,* retired General Gordon Sullivan reflected on the possibilities, challenges, and uncertainties he saw in the post-Cold War strategic environment that required the Army to innovate in the 1990s. The changing environment indicated to Sullivan that the Army needed to also change, but it was not clear to him what change should look like. Borrowing a quote from historian Daniel Boorstin, Sullivan stated, "we are in…a fertile verge…a place of encounter between something and something else."[2] Sullivan's perspective offers an insight into the ambiguity and uncertainty of peacetime innovation. Wartime innovation, or more appropriately adaptation, has the immediate feedback system provided by the battlefield. The space and time between positing a new idea and realizing it does not work are much shorter than during peacetime. Peacetime innovation must account for various possible futures while facing the constraints of limited resources and imperfect information. During peacetime, Clausewitz's fog of war is replaced by the fog of peace. Defense policymakers[3] find the friction associated with war supplanted by the challenges of

[1] Niccolò Machiavelli, *The Prince*, 2nd ed. (Chicago, IL: University of Chicago Press, 1998), 12.
[2] Gordon R. Sullivan and Michael V. Harper, *Hope Is Not a Method: What Business Leaders Can Learn from America's Army* (New York, NY: Times Business, 1996), 43.
[3] Defense policymakers include both military leaders and civilian defense officials. The military innovation process in a US political context, generally speaking, requires participation from both groups.

leading change within a defense policy system where their formal authority is necessary but not sufficient. The seemingly simple tasks become difficult.

Despite the uncertainty associated with limited information, defense policymakers must still plan for the future. Leading change is not as simple as giving orders and telling people what to do. Military organizations during peacetime take on the form of political communities. During periods of change, an ideological struggle ensues among these communities as leaders debate what the next war will look like and how it will be fought.[4] Within this struggle, defense policymakers must build consensus on which paths to take. For innovation to take hold in peacetime, new ideas must be accepted by those who will do the fighting. Absent the realities of war, peacetime experimentation provides advocates of a theory of victory the forum to convince those who will fight that their theory is the right choice. Rather than revealing the nature of future warfare, experimentation instead is most valuable as a consensus-building tool.

While military innovation research identifies experimentation as a critical component of innovation, existing models offer limited insights into what happens during experimentation or how it supports innovation. Existing research suggests that peacetime military experimentation is a process that discovers new data regarding a potential innovation, neglecting to address the social construction associated with knowledge generation among groups. Moreover, existing historical analyses are not representative of today's military systems. Thus, military experimentation, the iterative learning process of exploring changes in the conduct of warfare, their feasibility, utility, and limitations, remains a puzzle and an ill-described policy tool. This dissertation addresses this research gap by

[4] Stephen Rosen characterizes peacetime military organizations as complex political communities that compete in an ideological struggle during periods of innovation, Stephen Peter Rosen, *Winning the Next War: Innovation and the Modern Military* (Ithaca: Cornell University Press, 1991), 20.

answering the central research question: Under what circumstances does military experimentation support the transition of an innovation to implementation during peacetime?

## B. SUMMARY OF THE ARGUMENT

This dissertation argues that peacetime military experimentation is a social process within which organizations, groups, and actors influence the ideological competition within a defense policy subsystem to build consensus around a theory of victory, a view of what war will look like and how it will be won.[5] Senior leaders sponsor experimentation, but their sponsorship is not sufficient to successfully transition from experimentation to implementation. Instead, senior leaders couple experimentation with an advocacy network, a loose coalition of defense policymakers and policy influencers. As the advocacy network's size and strength increase, the probability of the experimentation process leading to a successful transition to implementation also increases. The following discussion examines the components of this argument in more detail.

Arguing that peacetime military experimentation is a social process is different than arguing it is an analytical process for learning about new ways of fighting. Social processes involve constructing knowledge and achieving consensus on beliefs of 'what is true' and 'what works.' During war, this process happens through shared experiences on the battlefield that generate new goals, new language, and new ways of fighting. Organizations, groups, and actors who advocate for a theory of victory turn to experimentation during peacetime as a forum for generating ideological agreement.

[5] Stephen Rosen defines a theory of victory as "an explanation of what the next war will look like and how officers must fight if it is to be won," in Rosen, *Winning the Next War*, 20.

During peacetime, the path towards ideological agreement begins with consensus on what war will look like in the future. Militaries experiment during peacetime using a replication of the phenomenon of war. However, replication of war is not the same as reality and requires assumptions about the threat, the environment, capabilities, and many other variables. Moreover, it faces political and social constraints, such as the terrain where these simulations can take place or to what extent they can reflect potential future scenarios. Additionally, military experimentation lacks replicability and control, making each experiment different than the one before and after it. Those who advocate for a theory of victory must convince others to accept these assumptions as valid and accept their theory over others.

Arguing that peacetime military experimentation is a social process sets this dissertation apart from conventional perspectives. For example, Williamson Murray and Allan Millett's seminal work on military innovation, *Military Innovation in the Interwar Period,* concludes that the US Navy's development of carrier warfare benefitted from experimentation, in the form of tactical simulations, that provided "a systemic analytic device for exploring naval aviation's potential."[6] From this perspective, experimentation's value was in generating new information that informed decisions regarding the aircraft and ships needed in the future. While not incorrect, this perspective limits the understanding of experimentation as a policy tool. It is not a neutral effort to distill information about future warfare. Instead, it provides an opportunity for senior leaders to build the consensus they will need to drive the innovation process forward.

As a process, experimentation begins with inputs and produces outputs. The inputs include communities of practice, a core advocacy network, and a theory of victory. The

[6] Williamson Murray and Alan R. Millett, eds., *Military Innovation in the Interwar Period* (New York, NY: Cambridge University Press, 1996), 399.

experimentation process is the playing field upon which the ideological competition over how the military should fight takes place. Organizations, groups, and actors within the defense policy subsystem interact as part of an iterative experimentation process. When successful, experimentation produces outputs in the form of increased consensus regarding a theory of victory, a strengthened advocacy network, and new communities of practice.

Senior leaders play a pivotal role throughout the experimentation process, starting with their sponsorship of a theory of victory and allocation of resources for experimentation. However, as the experimentation process continues, a senior leader requires the influence of an advocacy network that can garner support for a theory of victory within essential entities of the defense policy subsystem, such as Congress and the Department of Defense. As the size and strength of an advocacy network increase during the experimentation process, it garners the requisite support to win the ideological struggle and transition a theory of victory from experimentation to implementation. Advocates diffuse their ideas across more and more of the policy subsystem, building legitimacy and consensus around their ideas within the organizations, groups, and actors who make and influence policy. The advocacy network increases its strength and size by building connections between key elements in the policy subsystem, serving as an information broker, and benefiting from the strength of weak ties. Additionally, it leverages the centrality of others to control information, more effectively diffuse ideas, and strengthen its position within the policy subsystem.

## C. CONTRIBUTIONS OF THIS DISSERTATION

This dissertation makes several contributions to the existing military innovation studies literature. First, it fills the research gap regarding how existing research describes peacetime military experimentation and how it actually happens. The argument that peacetime military experimentation is a social process where military organizations build

consensus around an innovation differs from existing literature that limits the understanding of experimentation as an analytical process centered on improving an innovation through new information. Second, this dissertation contributes a focused study of peacetime military experimentation. Previous studies focused on either the best practices of military experimentation or examining how militaries did or did not learn during experimentation as part of a larger innovation study. This dissertation provides an original take on the process.

Third, this dissertation contributes three new cases to military innovations studies, strengthened by more than 70 interviews with those who experienced the experimentation process. These cases also expand existing research by examining previously developed causal variables in new contexts. Fourth, this dissertation provides an inductively derived peacetime military experimentation framework that combines concepts from military innovation studies, sociology of science and technology, and organizational learning to clarify terms and create analytical coherence with existing military innovation frameworks. Finally, the results will further policymakers' understanding of military experimentation, how it works as a process, and under what circumstances it supports the transition to implementation of an innovation during peacetime.

## D. IMPLICATIONS FOR POLICY

Viewing peacetime military innovation as a social process that builds consensus rather than just a process that uncovers new data about potential future options has significant implications for defense policymakers. First, most notably, if policymakers view experimentation as the latter rather than the former, they would expect to provide resources, bureaucratic top-cover, and guidance for the experimentation process to generate what they need for an innovation. The cases in this dissertation suggest there is a high probability they will be disappointed in the outcome. This approach could hamstring a potential innovation

wasting crucial time, intellectual energy, and budgetary resources, and leaving a military unprepared for the future. To increase the probability of these processes bearing fruit, the cases in this dissertation suggest that experimentation needs more than budgetary resources or the protection of new ideas. Instead, the leaders involved have to focus on understanding how to build consensus among communities within the experiments themselves and then how to export the experiments and their results through an advocacy network to the broader defense policy subsystem.

The second policy implication is the importance of senior leaders during the experimentation process. Like previous military innovation research, this dissertation emphasizes that senior leader sponsorship is necessary but not sufficient. Highlighting this point can lead to an overemphasis on the statement's 'not sufficient' part as cases portray leaders at different levels wrestling with innovation efforts, often unsuccessfully. This dissertation demonstrates that senior leaders are necessary for more than just their formal authority. Senior leaders should pair their formal authority with specific leadership characteristics. In the Army's New Louisiana Maneuvers, Chief of Staff of the Army Gordon Sullivan stood out as such a leader. Sullivan possessed the intellect to develop a vision, the ability to communicate it to the right audiences to mobilize the forces of change, the charisma necessary to build trust with those who change would affect the most, and the force of personality to drive the experimentation process. In addition to these characteristics, Sullivan benefited from personal and professional networks that connected him with key constituencies across the defense policy subsystem, enabling him to build the momentum for change that experimentation can unlock quickly.

If having General Sullivan was critical to the Army's experimentation process, how can organizations increase the probability of having leaders like him in the right position when they try to innovate? What skills make him unique, and how do organizations develop

those skills in their leaders? Are leaders who can successfully lead innovation the same as leaders who would be successful in combat? While answering these questions is beyond the scope of this study, they highlight the implication that military organizations must create developmental paths for leaders like Sullivan to increase the probability of meeting the demands of the future.

Third, within the cases in this dissertation, those who ended up conducting or leading experimentation did so despite lacking the required education, experience, and tools. In most examples, leaders learned quickly, but the learning curve for most was extremely steep. For instance, during the Force XXI experiments, leaders discovered that experimentation required different logic and skills. In the joint experimentation case, the lack of understanding and familiarity with experimentation negatively impacted Millennium Challenge.

With so much at stake in terms of budgetary and opportunity costs, military organizations must find ways to expose leaders to experimentation earlier on. Problem-solving techniques are not a new phenomenon in military organizations. For example, military professionals spend their careers learning how to train. Training, how it is resourced, planned, and executed, is the pre-dominant problem-solving approach. Just like training, experimentation is a skill set that must be learned. Within the US military, experimentation lacks the same kind of language and structure, and therefore leaders struggle to conduct the imaginative problem-solving that experimentation demands. Furthermore, if peacetime military experimentation is a social process, experimentation should not be relegated to a small population of leaders. Instead, it needs leaders from different communities with the credibility and professional standing that comes with operational experience to help build consensus.

This dissertation also presents an implication for scholarship. For military innovations studies to reflect more closely the environment within which innovation occurs, it should examine the defense policy subsystem and the complex relationships between the entities within it. Much of existing research focuses on the relationships between military professionals inside a service, inter-service rivalries, civilian-military relations, or organizational culture.[7] There is little research in military innovation studies that captures the context of the contemporary defense policy subsystem and the myriad of policymaking and policy-influencing actors, groups, and organizations. A more holistic approach to understanding the context of innovation would bring military innovations studies in line with other schools, such as public policy, that use system-based frameworks to examine policy development and implementation.

## E. PLAN OF STUDY

This dissertation proceeds as follows. The remainder of this chapter discusses the associated literature review to help frame the problem and introduce the components of the peacetime military framework that forms the analytical lens for the dissertation. The chapter continues with a discussion of a posited causal mechanism and the dissertation's critical assumption and two hypotheses. Finally, the chapter concludes with a discussion of the associated variables and the research design and methodology for the dissertation.

Chapters 2 and 3 provide diverse cases to test the two hypotheses in cases that represent the full range of possible values of the variables of interest associated with the posited causal mechanism. Chapter 4 examines a deviant case that produces an unexpected outcome relative to the causal mechanism. Each case study chapter utilizes the peacetime

[7] For a systemic review of these different studies of innovation contexts see Adam Grissom, "The Future of Military Innovation Studies," *Journal of Strategic Studies* 29, no. 5 (October 2006): 905–34.

military experimentation framework to describe the context associated with the case and analyze the inputs, characteristics, and outputs of the experimentation process. The final section of each case study chapter summarizes the findings regarding the causal mechanisms and any additional conclusions. The following case study summaries below provide an early look at how each supports the dissertation's arguments.

Chapter 2, the US Army's 9th Infantry Division in the early 1980s, examines an instance where an experimentation process with a weak advocacy network failed to support the transition of an innovation to implementation. External events in 1979, such as the Soviet invasion of Afghanistan, led the Chief of Staff of the Army, General Edward Meyer, to pair the 9th Infantry Division (ID) at Fort Lewis, Washington, with a High Technology Test Bed to experiment with a light division that could fight like a heavy division. Experimentation produced a motorized infantry concept that utilized speed, decentralized command and control, and precision weapons instead of mass and armored protection. However, experimentation met resistance because it threatened the existing initiatives of the Army's combat developments organization and the readiness requirements required to meet existing operational demands. General Meyer, his successor, and the 9th ID leadership were unsuccessful in creating an advocacy network to overcome the internal resistance within the Army. Without the support of key organizations, the motorized concept failed to gain external support despite a series of successful evaluations and certifications. As a result, the Division remained in its interim design, relying heavily on surrogate equipment until it transitioned to mechanized infantry in 1989.

Chapter 3, the New Louisiana Maneuvers/Force XXI experiments of the 1990s, analyzes the circumstances under which an experimentation process with a strong advocacy network resulted in the successful transition to implementation. As the Chief of Staff of the Army, General Gordon Sullivan understood that the Army of the post-Cold War era would

need to be different from the Army that fought in the Gulf War. Sullivan's theory of victory was a force projection Army that leveraged digital technologies to share information at the speed necessary to effectively conduct a range of military operations to secure America's global interests, a stark contrast to its Cold War focus. Sullivan initiated an experimentation process known as the New Louisiana Maneuvers to shape the post-Cold War Army and build consensus around evolving ideas. Sullivan developed an advocacy network to distribute the ideas coming out of the experimentation process to key constituents across the defense policy subsystem. His successor, General Dennis Reimer, continued this process through the Force XXI Advanced Warfighting Experiments (AWE). Force XXI led to the development of a division with digital command and control capabilities and new logistics organizations which served as the template for future forces. The Division became a prototype that the Army quickly scaled up in preparation for the Iraq war in 2003.

Chapter 4 focuses on Joint Forces Command's joint experimentation of the late 1990s and early 2000s, culminating with Millennium Challenge 2002. This serves as a deviant case where experimentation began with an initially strong advocacy network but failed to transition the innovation to the implementation stage. Congressionally mandated joint experimentation to explore emerging military capabilities, known as the Revolution of Military Affairs (RMA), coincided with Donald Rumsfeld's return as Secretary of Defense and his defense transformation initiatives. An ideological competition developed between RMA-Optimists and RMA-Skeptics centered on Rumsfeld's reform efforts. These events set the stage for Millennium Challenge 2002, the largest US joint experiment in history involving more than 13,500 personnel and costing more than $250 million, focused on a joint integrating concept, Rapid Decisive Operations. While JFCOM's experimentation initially benefited from a strong advocacy network, a respected retired General officer alleged the experiment was rigged to produce outcomes that favored Rumsfeld's reforms. His public

comments created an enduring counter-narrative that significantly restrained momentum for reform, degraded support from key entities such as Congress, and supported those RMA-Skeptics belief that advanced technologies could not subjugate war's uncertainty and chance. This ideological struggle continues today to the detriment of finding a solution.

Chapter 5 summarizes each argument's findings and discusses the dissertation's contributions, policy implications, and recommended areas for future research.

## II. Theoretical Foundations and Literature Review

### A. What is Military Experimentation?

How is the term 'experimentation' used in a military context? What do defense leaders mean when they say 'experimentation'? For decades, policymakers have used the terms *experiment* and *experimentation* in US national security documents and public statements. For example, in Secretary of Defense Annual Reports to the President and Congress spanning 1995 to 2005, 'experiment' appeared more than 590 times, including more than 137 times in the 2001 report alone.[8] While the use of these terms ebbed and flowed over time, a shared understanding of their meaning in a military context remains an issue. The following quote from Admiral Harold Gehman, the first commander of Joint Forces Command, in 1999 to the Congressional Sub-committee on Emerging Threats and Capabilities illustrates the confusion:

> In my definition of joint experimentation which, by the way, was never defined for us by either the Department of Defense or Congress- it was just go out and do it-but in my definition of joint experimentation, I define joint experimentation as having two purposes. The first purpose is to maintain the current United States superiority. The second purpose is to prevent adversarial surprises.[9]

[8] The author conducted a keyword search for 'experiment' within Annual Reports from "Secretary of Defense Annual Reports," Historical Office, Office of the Secretary of Defense, accessed May 31, 2021, https://history.defense.gov/Historical-Sources/Secretary-of-Defense-Annual-Reports/.

[9] United States Congress Senate Committee on Armed Services Subcommittee on Emerging Threats and Capabilities, "The Efforts of the Military Services in Implementing Joint Experimentation: Hearing Before the

While Admiral Gehman's definition is informative, it only addresses what the US military intended to achieve with experimentation, not what military experimentation is or what it entails. A more recent publication, the January 2021 Department of Defense Dictionary of Military and Associated Terms, also fails to provide an authoritative definition.[10]

Despite the lack of an official definition, the terms 'experiment' and 'experimentation' remain prevalent in defense policymakers' public statements. For example, in 2016, General Mark Milley stated that "legitimate and genuine experimentation" was essential to ensure the Army did not cling to "sacred cows," which could prove ineffective in future warfare.[11] In 2019, the Commander of US Indo-Pacific Command, Admiral Phillip Davidson, highlighted the importance of experimentation for "testing and integrating new technologies, developing new capabilities, and exploring new concepts of operation and employment."[12] Innovation and experimentation served as one of four focus areas for the command, combining to provide the programmatic activities necessary to ensure military effectiveness in the future. In these statements and policy documents, experimentation implies the front-end work of innovation, often referred to as a necessary learning process that must take place for US military organizations to remain effective in the future.

While military innovation literature agrees that experimentation is part of the innovation process, similar to defense policymakers and defense organizations, existing

---

Subcommittee on Emerging Threats and Capabilities of the Committee on Armed Services, United States Senate, One Hundred Sixth Congress, First Session, October 20, 1999," § Subcommittee on Emerging Threats and Capabilities of the Committee on Armed Services, United States Senate (2000), 7.

[10] Office of the Chairman of the Joint Chiefs of Staff, "Department of Defense Dictionary of Military and Associated Terms" (The Joint Staff, January 2021).

[11] Gen Mark A. Milley, "Speech at the AUSA Eisenhower Luncheon" (Washington, D.C., October 4, 2016), http://wpswps.org/wp-content/uploads/2016/11/20161004_CSA_AUSA_Eisenhower_Transcripts.pdf, 14-15.

[12] Admiral Phillip S. Davidson, "U.S. Indo-Pacific Command Posture," § Senate Armed Services Committee (2019), https://www.armed-services.senate.gov/imo/media/doc/Davidson_02-12-19.pdf, 24.

literature also lacks agreement on a definition. Mahnken outlines different experimentation indicators, such as field exercises and war games, and organizations tasked with experimentation as a core mission but falls short of a definition.[13] Krepinevich's arguments in favor of military experimentation highlight its benefits for US military forces and the required characteristics of successful experimentation, using the historical analogs of US carrier warfare and German combined arms to stress the connection between experimentation as an analytical process and innovation. However, like Mahnken, Krepinevich focuses on the activities and benefits of experimentation without providing a definition.[14] The lack of coherence between practitioners and academics creates confusion regarding military experimentation and how experimentation contributes to innovation.

In the 1990s, the success of the Gulf War and the promise of information technologies as part of a Revolution in Military Affairs created an interest in experimentation across the US defense policy ecosystem. Each service began its own experimentation efforts, such as the Marine Corps' Sea Dragon experimentation plan and the Army's Advanced Warfighter Experiments (AWEs).[15] Additionally, a Congressional mandate sought to codify these efforts into a broader effort focused on Joint military experimentation.[16] However, as Admiral Gehman's comments above illustrate, these developments struggled to bring a common understanding of military experimentation. To establish a common language within defense policy, separate research efforts from inside and outside the Department of Defense attempted to establish common terminology.[17]

---

[13] Thomas G. Mahnken, "China's Anti-Access Strategy in Historical and Theoretical Perspective," *Journal of Strategic Studies* 34, no. 3 (June 2011): 299–323, https://doi.org/10.1080/01402390.2011.574971.
[14] Krepinevich summarizes the benefits of experimentation in Andrew F. Krepinevich, "Military Experimentation: Time to Get Serious," *Naval War College Review* 54, no. 1 (Winter 2001): 76–89.
[15] William S. Cohen, "Annual Report to the President and the Congress" (Department of Defense, 1998), 48, 144-45.
[16] "National Defense Authorization Act for Fiscal Year 2001," Pub. L. No. 106–398, § 114 Stat. 1654 (2000).
[17] A variety of government and non-government sponsored research attempted to address this topic, among which included David S. Alberts and Richard E. Hayes, *Code of Best Practice for Experimentation*, CCRP

These efforts contain a variety of perspectives. Some emphasize hypothesis testing and experimental control, some point to the need for heuristically guided field research and discovery, and some argue for the inclusion of technological testing.[18] In *The Logic of Warfighting Experiments,* Kass aligns military experimentation with the scientific method, emphasizing cause and effect and experimental control methods.[19] However, while military experimentation may contain elements of scientific experimentation, it also differs in one specific aspect. It has more structure than regular experiential learning, but military experimentation often lacks the replicability and control of scientific experimentation. Military experimentation explores an ever-evolving set of specific questions rather than solely testing hypotheses. Hypothesis testing occurs, but it is not the predominant characteristic of military experimentation.[20]

Rather than focusing on one particular inquiry method, Worley drew from basic and applied research methods, comparing military experimentation with scientific experimentation, social science research, and technological invention.[21] Military experimentation involves the discovery and subsequent hypothesis testing of scientific experimentation, the trial-and-error methods of invention, and the performance measurement of social science. While hypothesis testing to verify cause and effect

---

Publication Series (Washington, D.C.: DoD Command and Control Research Program, 2002); Richard Kass, *The Logic of Warfighting Experiments, The Future of Command and Control* (Washington, DC: DoD Command and Control Research Program, 2006); Brian McCue, "The Practice of Military Experimentation:" (Fort Belvoir, VA: Defense Technical Information Center, February 1, 2003); D. Robert Worley, "Defining Military Experiments" (Alexandria, VA: Institute for Defense Analyses, February 1999).

[18] Kass and Worley are two examples of this argument. Each emphasizes different aspects of methodology, knowledge acquisition, and technique. Kass emphasizes establishing causal effects through manipulation, while Worley argues in favor of heuristic field research and discovery, Kass, *The Logic of Warfighting Experiments*, 21; Worley, "Defining Military Experiments," ES-2.

[19] Kass, *The Logic of Warfighting Experiments*, 15.

[20] Angevine summarizes these differences between scientific experiments and military experiments in Robert G Angevine, "Innovation and Experimentation in the US Navy: The UPTIDE Antisubmarine Warfare Experiments, 1969–721," *Journal of Strategic Studies* 28, no. 1 (February 2005): 77-105, 79.

[21] Worley, "Defining Military Experiments," 9.

relationships has a place within military experimentation, discovery and invention play a more prominent role. Worley synthesized the similarities and differences in the following definition: military experimentation is "a process of exploring innovative methods of operation, especially to assess their feasibility, evaluate their utility, or determine their limits."[22] The following statement aligns Worley's definition with existing military innovation research: military experimentation is *an iterative learning process of exploring changes in the conduct of warfare, especially to assess their feasibility, evaluate their utility, or determine their limits.*

Military experimentation involves a wide assortment of activities. In a contemporary US context, these experiments occur in a service or as part of Joint experimentation, which examines the integration of multiple services as part of a military system. Experimentation is a distinct category of activities, separate from military training or exercises that solve existing problems with existing methods.[23] Instead, policymakers describe the intended purpose of military experimentation as forward-facing, acquiring knowledge that guides "decisions about an uncertain future."[24] Experimentation activities involve varying abstractness levels, from wargames that involve no actual forces to field exercises, including friendly and opposing forces equipped with prototype technologies. As Worley points out, each activity is purposeful and utilizes a combination of basic and applied research methods. For example, the Army's recent Project Convergence experiments used a series of simulations leading up to live experiments in Yuma, Arizona. These experiments incorporated a variety of linked military systems, including Air Force, Navy, and Marine Corps equipment, to examine emerging technologies, organizational designs, and areas for future investment.[25]

---

[22] Worley, "Defining Military Experiments," ES-2.
[23] Harold W Gehman Jr and James M Dubik, "Military Transformation and Joint Experimentation," *Defense Horizons*, no. 46 (December 2004): 1–8.
[24] Worley, "Defining Military Experiments," 2.
[25] Stew Magnuson, "Army's Project Convergence Continues on 10-Year Learning Curve," December 17, 2021, https://www.nationaldefensemagazine.org/articles/2021/12/17/armys-project-convergence-continues-on-10-year-learning-curve.

These descriptions draw a rough outline of how those within the defense policy use 'experimentation,' but analytical research requires additional detail. The different ways that defense leaders use 'experimentation' and the research discussed above indicates a focus on the functional aspect of experimentation as a learning process. This dissertation agrees that there is a functional component that does support innovation. However, it is not the most important component for innovation. A broader understanding of experimentation in different contexts provides an opportunity to observe and examine the social aspects of peacetime experimentation and how it supports the innovation process. Several questions guide the beginning of this analysis. If military experimentation is an iterative process, what are its inputs and outputs? What other purposes does it serve besides knowledge generation? How do the limitations of peacetime impact this process? How does experimentation integrate with other innovation activities? How can historical examples illustrate the effects of context on this process? The following literature review will address these questions.

## B. WHAT IS MILITARY INNOVATION?

Military innovation studies is an interdisciplinary field that draws from multiple specialties within the humanities and social sciences.[26] While the diversity of perspectives strengthens understanding of military innovation, it also presents challenges to analytical terms. A recent systemic review of the field addresses this shortfall by synthesizing broad themes across military innovation definitions within the literature. From these themes, Horowitz and Pindyck define military innovation as "changes in the conduct of warfare

[26] Griffin highlights both the values and limitations of military innovation studies interdisciplinary characteristics in his review of the field, Stuart Griffin, "Military Innovation Studies: Multidisciplinary or Lacking Discipline? 1," *Journal of Strategic Studies* 40, no. 1–2 (January 2, 2017): 196–224.

designed to increase the ability of a military community to generate power."[27] This definition enables more robust comparative research but requires further explanation.

There are three significant points regarding their definition. First, "changes in the conduct of warfare" requires specification regarding the magnitude of change. Rosen addresses the issue by delineating an innovation as "a change in one of the primary combat arms of a service in the way it fights or alternatively, as the creation of a new combat arm." Doctrinal change alone is insufficient without associated organizational change.[28] Second, "designed to increase" indicates an intention but does not require that innovation leads to a military victory. Militaries could innovate during peacetime but never use the innovation during an actual war. Additionally, many explanatory variables could impact if innovation leads to a military victory, regardless of its effectiveness. This qualifier is essential when considering the universe of possible innovations to study. A "military community" includes narrow areas, such as branches, or more diverse groups, such as military services. Finally, "military power" refers to people, organizations, and technologies. While technologies may spark innovative ideas, they alone do not result in innovation.[29]

### C. MILITARY INNOVATION DRIVERS

Existing research points to external and internal factors leading to why and when innovation occurs.[30] One perspective identifies external stimuli, such as civilian leadership and a perceived imbalance in military power relative to security threats combining to initiate innovation. Posen's analysis of the German development of Blitzkrieg doctrine highlights

---

[27] Michael C. Horowitz and Shira Pindyck, "What Is a Military Innovation and Why It Matters," *Journal of Strategic Studies*, March 22, 2022, 1–30, https://doi.org/10.1080/01402390.2022.2038572, 15.
[28] Rosen, *Winning the Next War*, 7-8.
[29] Horowitz and Pindyck, "What Is a Military Innovation and Why It Matters," 9.
[30] Nagl and Grissom summarize each summarize drivers of innovation as external and internal factors. Grissom, "The Future of Military Innovation Studies," 908–19; John A. Nagl, *Learning to Eat Soup with a Knife* (Chicago: University of Chicago Press, 2002), 3-11.

the role of civilian leaders, Germany's strategic positioning, and the importance of experimentation in developing an innovation. External stimuli can also include inter-service budgetary competition, which drives military organizations to innovate to secure resources. For example, US missile programs developed as the Navy, Air Force, and Army competed for primacy in new operational areas. Otherwise reluctant military officers secured budget resources, assembled talent, and organized around new missions within their respective service. [31] Experimentation supported these innovations by exploring how to integrate new technologies into evolving military systems.[32]

Rosen points to endogenous innovation drivers during peacetime in contrast to external stimuli. Peacetime military organizations are similar to political communities where ideological debates determine "who should rule and how the 'citizens' should live."[33] He concludes that during peacetime successful innovations happen when senior leaders posit a "new theory of victory, an explanation of what the next war will look like and how officers must fight if it is to be won," and create promotion paths for junior officers who adopt the theory. These efforts combine to overcome the ensuing ideological struggle and institutionalize innovative thinking.[34] In his examination of Army doctrinal change, Jensen builds on Rosen's endogenous innovation concepts, pointing to senior leaders who leverage incubators as space for military professionals to develop new ideas free from organizational

---

[31] U.S. Navy and Air Force competition surrounding the Polaris program is analyzed in Harvey M. Sapolsky, *Polaris System Development: Bureaucratic and Programmatic Success in Government* (Cambridge, MA: Harvard UP 1972); The Thor-Jupiter competition between the Air Force and Army is covered in Michael H. Armacost, *The Politics of Weapons Innovation: The Thor-Jupiter Controversy* (New York: Columbia UP 1969).

[32] Donald MacKenzie analyzes the social construction of accuracy in nuclear weapons through the testing and experimentation Donald A. MacKenzie, *Inventing Accuracy: An Historical Sociology of Nuclear Missile Guidance*, Inside Technology (Cambridge, Mass: MIT Press, 1990), 1-26; Bacevich points to Army experimentation with atomic weapons in the 1950s as an alternative to mutually assured destruction, A.J. Bacevich, *The Pentomic Era: The U.S. Army Between Korea and Vietnam* (National Defense University Press, 1986), 53-57.

[33] Stephen Peter Rosen, "New Ways of War: Understanding Military Innovation," *International Security* 13, no. 1 (1988), 141.

[34] Rosen, *Winning the Next War*, 20.

routines. A new theory of victory requires an advocacy network with sufficient bureaucratic power to dedicate resources to experimentation. Jensen concludes that "the more of the institution the networks can connect to, the more likely they are to increase the perceived legitimacy of the advocated idea."[35] As the burgeoning theory diffuses across the network, it builds bureaucratic momentum, setting conditions for innovations to take hold.[36]

Organizational culture also encourages internal change, providing new ideas and perspectives to solve problems as they evolve in the security environment. Nagl points to organizational culture, the "persistent, patterned way of thinking about the central tasks of and human relationships within an organization,"[37] as a critical variable in whether military organizations will explore new methods of warfare, using the British experience in Malaya and US experience in Vietnam as empirical examples.[38] Additionally, Farrell's analysis identifies culture impacting innovation through senior leaders who reshape culture to spur innovation, external shocks that reshape culture to encourage innovation, and cross-national military culture that leads militaries to emulate one another.[39] Finally, organizational culture can make organizations more likely to experiment and integrate new knowledge into organizational methods and structures.

### D. MILITARY INNOVATION FRAMEWORKS

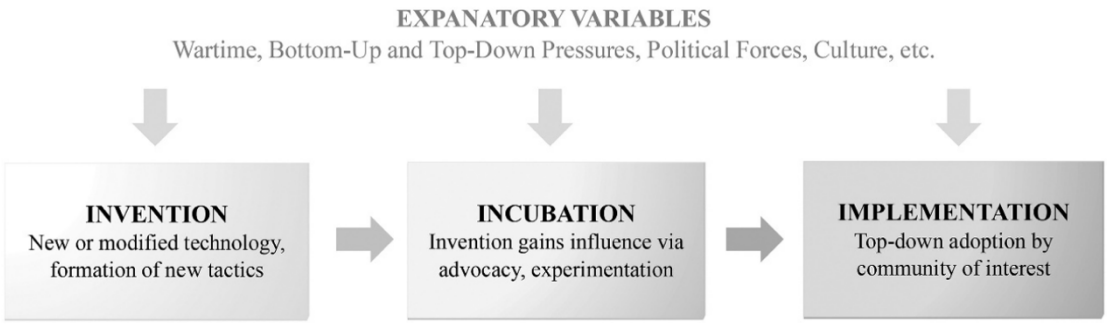
Military innovation is not a momentary event, like turning on a light switch. Instead, innovation takes time, and therefore several authors have described it as a process. Mahnken explains that military innovation occurs in three phases, speculation, experimentation, and

---

[35] Benjamin Jensen, *Forging the Sword: Doctrinal Change in the U.S. Army*, (Stanford, CA: Stanford University Press, 2016), 145
[36] Ibid., 142.
[37] James Wilson quoted in Nagl, *Eating Soup with a Knife,* 5.
[38] Ibid., 213-223.
[39] Grissom synthesizes these three points in his systemic review, Grissom, "The Future of Military Innovation Studies," 917.

implementation.[40] While Mahnken describes each phase, understanding the range of activities associated with each stage and how each is different required further analysis. Horowitz and Pindyck build on Mahnken's framework to describe a military innovation process consisting of three stages: invention, incubation, and implementation (see Figure 1.1 below).

Figure 1.1: The Military Innovation Process[41]




Horowitz and Pindyck posit experimentation occurs during the incubation stage, either within organizations charged with experimentation or with organizations whose core task is experimentation. Other process models limit experimentation to broad, top-down organizational efforts, while this model opens the door to bottom-up models in the invention and incubation stages.[42] This distinction is important because it recognizes the possibility of bottom-up experimentation efforts, in addition to those top-down instances often cited in existing research. For example, the previously mentioned US development of carrier warfare, a top-down innovation, involved a series of table-top wargames, or simulations, within the Naval War College.[43] In top-down cases, military and civilian defense

[40] Mahnken, "China's Anti-Access Strategy in Historical and Theoretical Perspective," 303.
[41] Horowitz and Pindyck, "What Is a Military Innovation and Why It Matters," 16.
[42] Ibid., 18.
[43] Murray and Watts discuss experimentation and carrier warfare in Murray and Millett, *Military Innovation in the Interwar Period*, p. 383-415.

officials foster innovation as the leaders of large bureaucratic organizations. In contrast, bottom-up efforts bring ideas forward from user groups, ideas that are eventually accepted by senior leaders who facilitate the innovation process.[44] Bottom-up innovation approaches have also involved experimentation, such as the US Navy's UPTIDE anti-submarine warfare exercises of the early 1970s.[45] If experimentation occurs in both bottom-up and top-down innovation approaches, an examination of military experimentation should consider both.

### E. HISTORICAL EXAMPLES

Research concerning innovation drivers and frameworks identifies US carrier warfare and German combined arms maneuver as examples of successful military experimentation. In a very simplified narrative, US carrier warfare developed from a series of tactical simulations at the Naval War College, where Walter Simms oversaw a systemic intellectual exploration of carrier operations, their associated implications, and their utility in addressing potential US strategic challenges. Simms' efforts tied together with exercises in the fleet to examine the impacts of making carriers the predominant force projection platform. Simultaneously, Moffett, the Navy Bureau of Aeronautics' organizational head, created promotion paths for aviation officers and invested in aerial platforms based upon empirical data generated from experimentation efforts. This experimentation process that fed implementation efforts enabled the US Navy to develop a new vision of carrier warfare and, unlike the British Royal Navy, institutionalize this vision in time to be used in World War II.[46]

---

[44] Horowitz and Pindyck, "What Is a Military Innovation and Why It Matters," 10.
[45] UPTIDE experiments are described in detail in Robert Angevine's historical summary, Robert G Angevine, "Innovation and Experimentation in the US Navy: The UPTIDE Antisubmarine Warfare Experiments, 1969–721," *Journal of Strategic Studies* 28, no. 1 (February 2005): 77–105, while Grissom offers a summary of UPTIDE as a bottom-up innovation example, Grissom, "The Future of Military Innovation Studies," 923.
[46] Summarized from Murray and Millett, *Military Innovation in the Interwar Period*, 383-415.

In the case of German combined arms maneuver, General Hans von Seeckt led the German military's institutional reform, beginning with a deliberate analysis of German operations during World War I. Von Seeckt used the lessons learned to drive doctrinal reform and then refined the revised doctrine through a series of field exercises. Although limitations on force strength and access to military equipment delayed implementing what became commonly known as *blitzkrieg,* the knowledge generated through experimentation facilitated implementation when resources became available. Moreover, von Seeckt's insistence on learning from previous German experiences and integrating that knowledge into experimentation efforts led to an ideological alignment within the German military that significantly increased their ability to implement new warfare methods rapidly.[47]

### F. RESEARCH GAPS

While these two examples serve as models of experimentation within military innovation literature, they have become highly simplified over time and fail to adequately describe the different interactions between organizations, groups, and actors as part of the social process of experimentation. This leads to a limited understanding of experimentation as a process to generate new empirical data. Moreover, these examples do not reflect the procedural mechanisms, incentive structures, and competing interests resident in the contemporary defense ecology of organizations, groups, and actors that shape experimentation and innovation.[48] They also promote an undersampling bias by constraining research to two predominant examples rather than accounting for a universe of cases that vary across multiple variables. These deficiencies result in the most significant research gap:

---

[47] Ibid., 34-45.

[48] Dr. John Hanley describes different periods in the Navy's history as having different ecologies. These ecologies help isolate how organizations, groups, and actors co-exist and the rules that govern their relationships. They vary over time as new organizations, groups, and actors influence the interaction of each. Interview with US Navy CAPT(Ret) John Hanley, interview by Ryan Kendall, June 7, 2021.

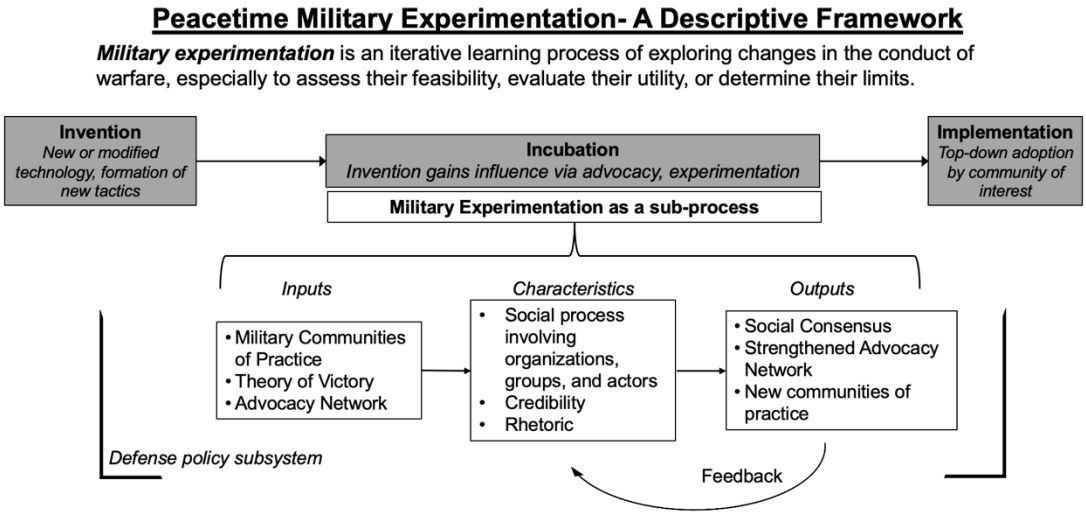
the mismatch between how existing research understands peacetime military experimentation and how it occurs in practice. A more in-depth understanding of the circumstances under which experimentation supports military innovation during peacetime requires concepts from outside existing military innovation research brought together in a coherent descriptive framework.

## III. Framework and Causal Mechanism

### A. PEACETIME MILITARY EXPERIMENTATION: A DESCRIPTIVE FRAMEWORK

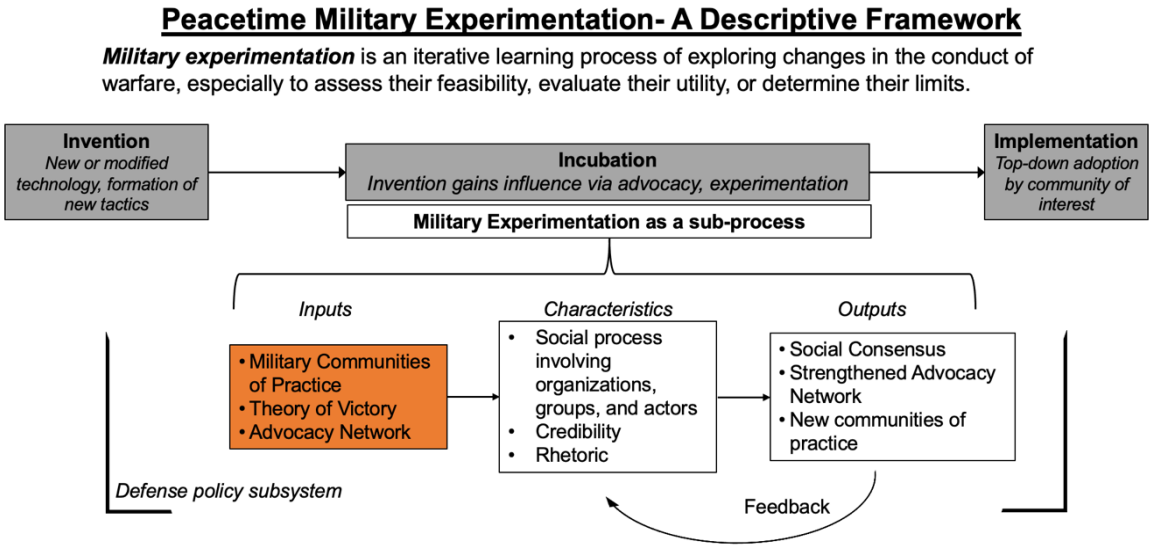
Understanding how military experimentation supports the peacetime innovation process requires a more expansive approach. Descriptive frameworks can help make the complex simpler by breaking a process into its constituent parts and connections. What remains is a broad sketch composed of fundamental generalities that bring an object that, to this point, has been unclear into focus. The following discussion will detail the proposed military experimentation framework in the figure below to address the existing shortcomings. After describing the framework, the discussion will continue with a causal mechanism and research hypotheses that orient case study analysis.

Figure 1.2: Peacetime Military Experimentation Framework




The framework above attempts to align military innovation studies, sociology of science and technology, and organizational learning research. Military experimentation sits as a sub-process inside Horowitz and Pindyck's previously discussed military innovation framework, depicted in the grey boxes at the top of Figure 1.2. From left to right, the framework identifies the inputs to military experimentation, the process's characteristics, and its associated outputs. In a US policy context, military experimentation takes place within the defense policy subsystem. As an iterative process, the outputs provide feedback for experimentation, and at a yet-to-be-determined transition point, set conditions for implementation.

Figure 1.2a: Military Experimentation Framework: Inputs




## A.1 Defense Policy Subsystem

To understand the relationships and interactions between different components of a process, it is helpful first to understand the context within which they exist. Subsystems provide a more expansive representation of the policy process, otherwise depicted as closed system iron triangles containing a limited number of actors.[49] In the US policy process, military experimentation and innovation occur within a policy subsystem characterized by substantive (defense policy) and territorial (US) dimensions.[50] External events, such as the collapse of the Soviet Union, and internal system parameters, such as constitutional authorities, define the context within which organizations, groups, and actors interact to turn

[49] Daniel McCool, "The Subsystem Family of Concepts: A Critique and a Proposal," *Political Research* Quarterly 51, no. 2 (June 1998), 551-553.
[50] Paul A. Sabatier and Christopher M. Weible, "The Advocacy Coalition Framework: Innovations and Clarifications," in *Theories of the Policy Process*, ed. Paul A. Sabatier, 2nd ed. (Boulder, CO: Westview Press, 2007), 192.

their policy beliefs into outcomes.[51] Subsystems account for both policymaking entities, those with the authority to make policy, and policy-influencing entities, those who interact in the process to shape outcomes. Although policymaking is limited to those with formal authorities, policy-influencing entities include, among others, the defense industries, the media, think tanks, service sub-groups, and the American public.

Military experimentation increases access to the defense policy subsystem for policy-influencing entities in the form of, among others, commercial and defense industry, multi-national partners, and those specialists associated with new technologies. Experimentation also offers entities different entrance points into the policy process than established policy routines. For example, in the Motorized Division of the 1980s, defense industry entities could offer technologies supporting experimentation activities rather than waiting for the Army to publish requirements within the established process. This difference dramatically increased the number of opportunities to influence policymaking and the rate of influence. In a more contemporary example, recent innovation initiatives by the Commandant of the Marine Corps, General David Berger, have met stiff resistance from a group of more than two dozen retired Marine Corps generals. These retired generals, including Secretary Jim Mattis and retired Lieutenant General Paul Van Riper, formed an ad-hoc policy-influencing group to pressure Congress and the Biden Administration to slow the momentum for Berger's reforms.[52] Each of these examples demonstrate the value of expanding the aperture of research to include the various entities of the policy subsystem.

---

[51] Sabatier and Jenkins-Smith outline the concepts of external events and internal stable parameters in their description of the Advocacy Coalition Framework in Paul A. Sabatier and Hank C. Jenkins-Smith, eds., *Policy Change and Learning: An Advocacy Coalition Approach, Theoretical Lenses on Public Policy* (Boulder, Colo: Westview Press, 1993), 18.

[52] Paul McCleary and Lee Hudson, "How Two Dozen Retired Generals Are Trying to Stop an Overhaul of the Marines," POLITICO, April 1, 2022, https://www.politico.com/news/2022/04/01/corps-detat-how-two-dozen-retired-generals-are-trying-to-stop-an-overhaul-of-the-marines-00022446.

## A.2 Inputs

Military communities of practice within the defense policy subsystem possess norms, beliefs, and values that shape learning activities. During the invention stage, a new *theory of victory* emerges, which utilizes new technologies, new tactics, or both to address observed or expected changes in the security environment. The new theory of victory diffuses initially through a core *advocacy network* and benefits from the sponsorship of senior leaders who mobilize the necessary bureaucratic resources to launch experimentation.

### *Military Communities of Practice*

A critical factor in military experimentation is the presence of military communities of practice. As a profession, the military has three identifiable features: expertise in the form of specialized knowledge, a responsibility to society, and shared consciousness in the form of corporateness.[53] Individuals belong to one or more military communities of practice within the profession, with shared beliefs akin to those found in scientific or technological disciplines. Similar to technological communities of practice, military communities of practice are hierarchical and can overlap one another. For example, the amphibious warfare community of practice brings together two different sub-communities: naval surface warfare and the Marine Corps. These communities remain free to develop solutions to specific problems within their expertise while also collaborating to solve problems using the norms, beliefs, and standard practices associated with their collective community. [54]

Within integrated military communities of practice, military professionals share views of validity, causal inference, and standard routines associated with problem-solving and

[53] Summarized from Jensen, *Forging the Sword*, 15-16.
[54] Kuhn describes scientific communities while Constant adapts Kuhn's concept to that of technological communities in his theory of technological change; Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 3rd ed. (Chicago: University of Chicago Press, 1970), Edward W. Constant, *The Origins of the Turbojet Revolution*, Johns Hopkins Studies in the History of Technology (Baltimore: Johns Hopkins University Press, 1980).

organizational learning.[55] Like Thomas Kuhn's concept of normal science in scientific communities, problem-solving serves as a knowledge generation and learning source.[56] Military professionals and organizations associated with a community of practice take pride in demonstrating their ability to solve these problems using existing routines during training exercises and operational commitments. Military professionals often see failure to produce expected results as a shortcoming of the professional or organization rather than the routine itself.[57] The risks of being unprepared and failing to meet the profession's societal commitment to provide effective military power incentivize learning activities associated with those problems the military deems valuable.

While many within the military communities of practice prioritize learning within existing routines, others scan for new problems and see the need to explore new methods. These two categories of knowledge generation, which March terms exploitation and exploration, comprise various alternatives for organizational leaders, each capable of creating knowledge. Exploitation aligns with Kuhnian problem solving as the "refinement and extension of existing competencies, technologies, and paradigms."[58] Military communities of practice remain stable within this category, adjusting incrementally to the environment. In contrast, exploration involves experimentation, risk-taking, and discovery, something March refers to as a technology of foolishness.[59] As a form of exploration, experimentation creates the possibility of a new community of practice emerging with new norms, a redefined shared

---

[55] Peter M. Haas, "Introduction: Epistemic Communities and International Policy Coordination," in *Epistemic Communities, Constructivism and International Environmental Politics*, 1st ed. (London: Routledge, 2015), 73–107.
[56] Kuhn, *The Structure of Scientific Revolutions*, 35-42.
[57] Center for Army Lessons Learned for example maintains lists of the most common mistakes for different organizations during particular training events. These lists offer suggestions for performing the prescribed routines more effectively, not necessarily for developing new routines.
[58] James G. March, "Exploration and Exploitation in Organizational Learning," *Organization Science* 2, no. 1, (1991): 71–87, 85.
[59]James G. March, "The Technology of Foolishness," in *Decisions and Organizations* (Cambridge, MA: Basil Blackwell, 1988), 253–65.

purpose, and revised cognitive models, resulting in a new social identity.[60] A military community of practice' shared views of validity, causal inference, and routines establish conventions for exploitation and exploration. Due to the interconnected and interdependent nature of military communities of practice, the more exploration activities deviate from these conventions, or the more a new community's social identity conflicts with established communities, the more unstable the ideological consensus over how war should be fought becomes.

Decisions regarding exploitation and exploration activities resemble the problem of managing uncertainty facing defense policymakers. Changes in the strategic environment lead some military leaders to understand that stasis is not an acceptable option. However, daily operations' demands incentivize an incrementalism approach. Professionals choose between existing alternatives, slowly building more efficient routines within existing military communities of practice without expending the resources necessary for innovation.[61] Problem-solving provides consistent returns and demonstrable short-term gains. It re-enforces what a community believes to be true because it focuses on the problems organizations choose to solve. However, under certain conditions, leaders decide to invest more resources in exploration activities, such as experimentation, allocating their attention to activities outside normal problem-solving. Military leaders and organizations experiment to address either the potential or actual functional failure of a system resulting from "new and more stringent conditions" or a demonstrated change in warfare, such as the emergence of

[60] The development of new scientific communities as outlined by Kuhn is like the formation of a new social identity. Abdelal et al. describes social identity as having two dimensions, content and contestation. In this case, I am I applying the four types of content to explain how a social identity evolves in conjunction with a new community of practice. Kuhn, *The Structure of Scientific Revolutions*, 10-22; Rawi Abdelal et al., eds., *Measuring Identity: A Guide for Social Scientists*, (Cambridge, MA; Cambridge University Press, 2009), 19-29.
[61] Charles E. Lindblom, "The Science of 'Muddling Through,'" *Public Administration Review* 19, no. 2 (1959): 79–88.

new technology on the battlefield.[62] For example, General Sullivan, recognizing the uncertainty associated with the post-Cold War strategic environment and the increased potential of emerging information technologies, understood that exploitation activities focused on solving problems with existing methods would not be sufficient. Sullivan instead turned to experimentation to build consensus around new ideas that would help prepare the Army for the future.[63]

***Theory of Victory***

The potential of new technologies and combinations of warfighting methods solidifies into a new theory of victory that creates a competition of ideas amongst military communities. The theory of victory can take the form of a new doctrine or an early idea communicated through official briefings. For example, before the Army's New Louisiana Maneuvers in the 1990s, Chief of Staff General Sullivan integrated the lessons from the Gulf War, new thinking regarding qualitative advantages of the microchip in modern warfare, and the Army's expanding role in the post-Cold War environment into revised doctrine.[64] In a less formal example, General Howze, who led the Army's Airmobile experiments of the 1960s, compiled his theory of victory for integrating aviation into combined arms units into a briefing that he delivered on numerous occasions to senior Army leaders in the Pentagon.[65] In each case, these theories of victory formed the intellectual foundation for the associated ideological struggle that ensued.

A theory of victory offers a new cognitive model through which military professionals understand the changing security environment and how they must interact

---

[62] Constant combines the ideas of Kuhn and Rosenberg in this concept of functional failure; Constant, *The Origins of the Turbojet Revolution*, 12-13.
[63] Sullivan and Harper, *Hope Is Not a Method*, 14.
[64] Jensen, *Forging the Sword*, 112; Sullivan and Harper, *Hope is Not a Method*, 96-97.
[65] Hamilton H. Howze, *A Cavalryman's Story: Memoirs of a Twentieth-Century Army General* (Washington, D.C: Smithsonian Institution Press, 1996), 185, 233.

with it. Theories of victory rely heavily on assumptions concerning threats, required technologies, and causal relationships. Additionally, theories of victory contain repertoires, implied ways to solve problems, and scenarios, descriptions of the environments in which the military organization might be called to act.[66] All or some of these factors may conflict with existing methods accepted by existing military communities. For example, early on, the US carrier warfare theory of victory included scenarios including five aircraft carriers, more than any navy possessed at that time. Additionally, the theory extolled the carrier's effectiveness over the battleship, a sharp contrast to the contemporary belief within the naval community.[67] While a particular theory of victory may later prove to be a mirage, professionals associated with a theory of victory believe in it and organize experimentation efforts around it.

***Advocacy Network***

The probability of a theory of victory gaining sufficient traction to overcome the propensity to normal problem-solving in favor of experimentation increases with the pairing of an advocacy network, a loose coalition of defense policymakers and policy influencers championing new reform initiatives, with a senior leader to protect them.[68] Within the early developmental stages of this advocacy network, a core collection of organizations, groups, and actors begin to form a collective social identity based on a theory of victory's new cognitive models, new language, revised collective norms, and shared goals and purpose.[69]

---

[66] Jensen summarizes work from military innovation, sociology, and organizational theory to expand on Rosen's concept of a theory of victory, Jensen, *Forging the Sword*, 17.
[67] Mahnken, "China's Anti-Access Strategy in Historical and Theoretical Perspective," 306.
[68] Jensen, *Forging the Sword*, 19-20.
[69] Abdelal et al. outline an analytical framework for examining identity, using the two dimensions of content and contestation. The authors describe content as involving constitutive norms, social purposes, relational comparisons, and cognitive models. Contestation is the degree with which a group agrees on the content of this shared identify. In this treatment, I am linking the formation of a network with the formation of the shared identity associated with experimentation which is not something these authors discuss. More detail on the

This formation of a collective identity strengthens belief in the theory of victory and helps the emerging advocacy network formulate a persuasive narrative. Members of the network then deploy this narrative using one or both of the strategies outlined below.

Advocacy networks tip the scales in favor of experimentation using two legitimation strategies to garner influence. First, advocacy networks utilize positional legitimation through appeals to authority and a leader's formal position to authorize new ideas. Second, advocacy networks broker consent by diffusing ideas throughout a policy subsystem.[70] Combined, these strategies decrease the social distance between the core advocacy network and key policy-influencing and policymaking entities within the policy subsystem. As a result, the advocacy network increases the speed, efficiency, and effectiveness with which it can "circulate and narrate new theories of victory."[71]

An advocacy network uses these strategies to achieve its goals by increasing its size and strength. Those within an advocacy network seek opportunities to extend their influence by increasing the number of weak ties with other entities in the policy subsystem. Experimentation efforts often take place in organizations that reside outside the mainstream of policymaking. While they may have regular and direct contact with the senior leader of a service, they find themselves initially isolated from the rest of the policy subsystem. From a network perspective, significant social distance could exist between the initial core advocacy network and key policy-influencing entities. Establishing weak ties increases the speed with which the network can distribute information by shortening the social distance between those directly involved with experimentation and those external to the efforts who can

---

components of collective identities can be found in Rawi Abdelal et al., eds., *Measuring Identity: A Guide for Social Scientists*, 19-32.

[70] Ibid., 21.

[71] Ibid., 19.

influence policy decisions, such as the defense industries, journalists, and think tanks.[72] These weak ties act as bridges to other parts of the subsystem, exposing others to new information and providing the advocacy network access to portions of the policy subsystem that would otherwise be inaccessible.

While the number of ties associated with a network is important, increasing strength also requires making the right ties. Ties with key policymaking entities that reside in the center of the policy subsystem have a value of their own. This central positioning, often referred to as betweenness centrality, places an entity at the shortest paths between other nodes, enabling significant control over information flows.[73] An entity that benefits from betweenness and control over other resources such as funding or human capital in the form of expertise is of significant interest to an advocacy network. Like a police officer controlling traffic, these nodes exert control over the flow of information and the distribution of resources, both of which are critical to the experimentation process. Positional legitimation and brokerage strategies enable an advocacy network to connect with these nodes at the micro and macro levels to influence the decision-makers and the mid-level military bureaucrats who operationalize decisions.

The Army's development of airmobile warfare provides an example of these strategies and how they increase a network's size and strength. Then Lieutenant General Gavin provided the senior leader sponsorship for Howze as he explored new ways of integrating aviation into Army units. As the Army's senior staff officer responsible for training, operations, and force design, Gavin's formal position legitimated Howze's ideas on

---

[72] Mark S. Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* 78, no. 6 (May 1973): 1360–80; Jensen, *Forging the Sword*, 20.

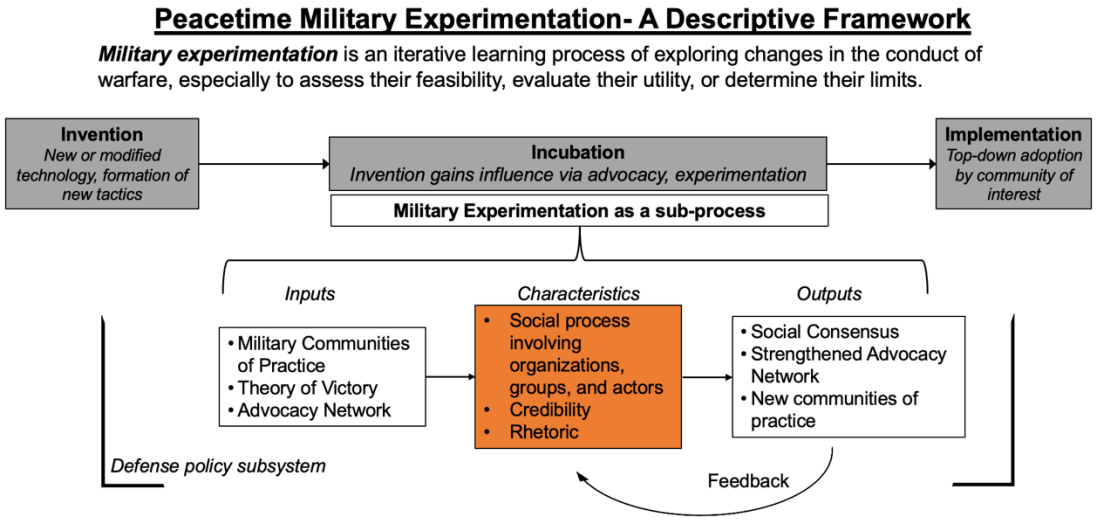
[73] For a general overview of centrality in networks see Anne-Marie Slaughter, *The Chessboard and the Web: Strategies of Connection in a Networked World*, The Henry L. Stimson Lectures Series (New Haven: Yale University Press, 2017), 48. For a more detailed perspective see Linton C. Freeman, "Centrality in Social Networks Conceptual Clarification," *Social Networks* 1, no. 3 (January 1978): 215–39.

air mobility. Furthermore, his sponsorship gave Howze the time and space to connect his ideas to other senior and mid-level Army leaders and policy-influencing entities across the subsystem. Howze used brokerage as a relational mechanism to connect multiple entities that previously had not been connected, decreasing the social distance between them.[74] His efforts extended the network's size and strength beyond the Army by diffusing these ideas throughout the policy subsystem, including into helicopter industry groups, strengthening calls for experimentation and further development.[75]

An advocacy network provides the connective social and political tissue to diffuse ideas across a policy subsystem, enabling ideas to move around potential bureaucratic barriers associated with parochial interests by connecting otherwise unconnected policy-influencing and policymaking entities. Absent the sponsorship of a senior leader and an advocacy network, military professionals face significant challenges to displace existing warfare methods and routines. A core advocacy network supported by a senior leader who husbands resources for experimentation on their behalf sets conditions for the experimentation process.

[74] Jensen describes Charles Tilley's concept of brokerage in his summary of advocacy networks in Jensen, *Forging the Sword*, 20. The idea to apply this concept to the Howze example belongs to the author of this paper.
[75] Howze, *A Cavalryman's Story*, 185, 233.

Figure 1.2b. Military Experimentation Framework: Characteristics




## A.3 Characteristics

Experimentation is *a social process* through which *organizations, groups, and actors* within the defense policy subsystem compete for ideological consensus by generating knowledge in the form of beliefs. Peacetime experimentation lacks the realities of war to validate concepts. Therefore, experimentation becomes an ideological battleground where organizations, groups, and actors debate which experimentation activities will occur, the scale and scope of experimentation, the use of available resources, and what lessons are learned. All experimentation rests on certain *assumptions* which must be sufficiently explored to convince military professionals that the theory of victory is the right choice and how they should measure success. The experimentation's *credibility* requires adherence to accepted conventions, such as replicating the environment, surrogate technologies, and portrayal of the enemy. Throughout the experimentation process, an advocacy network leverages *rhetoric,* a persuasive narrative that convinces organizations, groups, and actors to support a theory of victory and distributes it to key constituencies via an advocacy network.

### *A Social Process*

Sociology of science and technology research indicates experimentation is a socially constructed process, generating knowledge in the form of beliefs accepted as true within a social group.[76] Organizations, groups, and actors within the policy subsystem interact throughout the process according to political and social interests, shaping how experimentation generates knowledge and becomes accepted within communities of practice.[77] For example, industry groups lobby for specific technologies to play an outsized role in experimentation, different military communities of practice argue to include programs that support their concepts, and policymaking organizations ensure experimentation represents their equities. During this process, the advocacy network focuses on navigating the sea of divergent interests and conflicting ideologies to expand consensus on its chosen theory of victory by increasing its size and strength and, in turn, further solidifying the norms and beliefs of a new community of practice.

The experimentation process can occur within an individual service or as part of a more comprehensive defense policy effort. Participants come from internal and external sub-groups, such as separate branches (e.g., infantry, aviation, etc.), specializations, or private industry. Some sub-groups have established cultures, whereas, with new technologies, experimentation introduces new sub-groups into the process. In a US context, actors outside a service could have considerable influence over experimentation, such as Congressional members or senior Defense Department officials. Additionally, as technologies have increased in importance, private companies provide critical expertise on prototype

[76] Donald A. MacKenzie, "From Kwajalein to Armageddon? Testing and the Social Construction of Missile Accuracy," in *The Uses of Experiment*, ed. David Gooding, Trevor Pinch, and Simon Schaffer (Cambridge, UK: Cambridge University Press, 1989), 411.
[77] Ibid., 431.

equipment and experimentation technologies, such as simulation systems, increasing their role in experimentation.

The Army's experiments with airmobile warfare in 1962, known as the Howze Board, offer an illustrative example of how leaders in an advocacy network use experimentation to build consensus around a theory of victory. The experiments involved a mosaic of different groups and organizations who interacted to design, conduct, and then record and analyze results. First, the directive for the experiment came from the Secretary of Defense, Robert McNamara, at the suggestion of enterprising Army officers advocating for the airmobile concept. Second, representation included different Army branches, Army concept development organizations, Air Force representatives, and a civilian advisory board that included twelve different aircraft manufacturers who assessed the Army's existing aviation infrastructure. The board contacted over 400 ranking officers to solicit ideas and feedback and over 300 private firms to request different perspectives. Third, the experimentation process afforded different influence levels to other groups. For example, Howze permitted the Air Force representatives only to observe some of the deliberations based on their known dislike of the concept. Finally, competition over knowledge and ideas expanded from the theory of victory to include the experimentation process. The Howze Board experimentation activities included war games, simulations, and field tests. Despite his lack of faith in wargames, Howze understood that experiments must include wargames because "wargaming was very fashionable at that time and had to be included to satisfy our superiors."[78]

Such a constellation of interests highlights the challenges facing advocacy networks during the experimentation process. Experimentation is an extension of Rosen's political-

[78] Points summarized from Howze's description of the experiments in Chapter 19, Howze, *A Cavalryman's Story*, 233-257.

ideological struggle in his description of peacetime militaries as political communities. Experimentation is fertile ground for gaining influence or convincing others to join a burgeoning movement. However, advocacy networks are not the only ones arguing on behalf of their chosen ideology. Experimentation also serves as an opportunity for opposing coalitions to defeat a new theory of victory perceived as a threat. For example, the Air Force not only decried the results of the Howze Board but also conducted their own experiment to counter the Army's findings.[79] Within this process, organizations, groups, and actors who comprise different ideological entities attempt to influence what a community of practice explores, what means to use, and what to accept as true. The advocacy network of a senior-sponsored theory of victory works through this process to try to ensure that experimentation produces the social consensus required to transition to implementation.

The experimentation process occurs within both established and ad hoc organizations charged with experimentation. These organizations manage experimentation activities and have varying levels of influence throughout the policy subsystem. Business innovation research emphasizes these organizations' importance and the benefit of separating them from the larger institution. Christensen highlighted how businesses adapt to disruptive technologies, stressing the importance of spin-off organizations that could experiment while minimizing the impact on the established organization. These experimental organizations' loose coupling to the company's main business supported exploration activities by freeing them from existing markets' demands and the norms, social purposes, and cognitive models which define existing social groups.[80] At the beginning of the military experimentation process, these organizations help senior leaders systematize experimentation and focus resources. However, if the organization fails to sufficiently build

[79] Howze, *A Cavalryman's Story*, 233-257.
[80] Clayton M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, The Management of Innovation and Change Series (Boston, Mass: Harvard Business School Press, 1997), 176-177.

an advocacy network's size and strength early on, they become an easy target once the senior sponsorship ends. The isolation which was necessary to protect new ideas and concepts quickly becomes a weakness that can be too hard to overcome.

***Credibility***

For social groups to accept knowledge generated during experimentation as belief, communities of practice must view experimentation as credible. Credibility rests on the degree to which experimentation adheres to conventions. Conventions, the "consensual practices of groups of accredited practitioners," include such things as who should conduct experiments, the procedures they should follow, and the validity of associated assumptions.[81] These conventions represent the social consensus of communities of practice based on deep convictions and strongly held beliefs and experience. Combining these factors undergirds the experimentation's credibility, influencing both the acceptance or potential challenge of experimentation results and their usefulness for advocacy.

In military experimentation, as with other military endeavors, those within the military profession place a high degree of value on previous success during combat or training. Therefore, the competence of those performing experiments is critical to its credibility. For this reason, senior leaders fill essential positions within experimentation with hand-selected practitioners who possess the requisite background and who also have significant standing within powerful social groups. For example, General Howze served as the board president for the Army's air mobility experiments because he had previously served as the Director of Army Aviation and because of his experience leading armor and airborne units and his known expertise in maneuver warfare.[82] Howze' demonstrated

[81] MacKenzie summarizes Constant's discussion of conventions in technological testing in MacKenzie, "From Kwajalein to Armageddon? Testing and the Social Construction of Missile Accuracy," 416.
[82] Rosen highlight's General Gavin's selection of Howze to be the Director of Army Aviation as part of an effort to populate Army Aviation with proven, credible leaders. The direct mention of Howze in Secretary

competence was hard to dispute and added credibility to the experiments. Additionally, the diverse competence of the board members not only supported their claims but also helped them appeal to a broad set of communities of practice.[83] Finally, a high degree of competence amongst those performing the experiments makes it difficult for any external group to criticize its claims.

Peacetime experimentation must rely on a recreation of war. This recreation, the "construction of a background against which to measure success," requires experimentation to make a series of assumptions.[84] Experimentation can only replicate war up to a certain point. As battlefield characteristics such as lethality, range, the number of domains, and the cost of materiel have increased, that replication is further and further from reality. For example, social, political, or resource constraints limit how an experiment can recreate warfare. Areas designated for military operations are often void of several factors that impact warfare, such as large groups of civilians or dense urban terrain. Also, there are significant political and social constraints to conducting military experiments involving novel methods and technologies amongst civilian populations. Although experimentation cannot include these factors, it must include assumptions that are designed to account for their impacts. Additionally, experimentation must make assumptions for other variables such as the threat, terrain, weather, the availability of resources, and unit morale. Other activities, such as training and wargaming, also simulate war. However, the future orientation of experimentation requires an increased reliance on assumptions as the recreation of war moves further from the empirical realities of the present.

---

McNamara's directive memorandum outlining board personnel was written by Gavin's proteges with the same intended purpose in mind. For more see Rosen, *Winning the Next War*, 90.

[83] Howze, *A Cavalryman's Story*, 238.

[84] MacKenzie, *Inventing Accuracy*, 373.

In addition to replicating the environment where war occurs, experimentation must put a theory of victory into action. This requires assumptions regarding such components as required technologies, logistics, and yet-to-exist military organizations. For example, military experimentation often relies on surrogates to fill the role of emerging technologies, speculating their potential effectiveness before a technology is sufficiently developed. For example, the Army's experiments with motorized operations in the 1980s used military trucks in place of Fast-Attack Vehicles, which were crucial to the concept's success. Over time, the Army's inability to field the fast attack vehicles degraded the concept's validity, as short-term replacements failed to provide the same performance.

Militaries increasingly turn to simulations to replicate the scale and scope of modern military systems. Advancements in information technologies have increased the sophistication of simulations compared with analog war games. Still, their reliance on computer modeling and algorithms creates an incomplete reproduction of actual warfare. Simulations rely on assumptions regarding the effectiveness of weapons, organizations, and methods combined with the impact of environmental factors such as weather, terrain, and civilian populations. For example, during Joint Forces Command's Millennium Challenge 2002 experiment, planners "kludged together" more than 40 different models from a variety of Service simulations to support the experiment.[85]

Over time, these assumptions develop into bundles, becoming more intertwined and ingrained in experimentation. How much they align with conventions can significantly impact experimentation's credibility. Given what is at stake, convincing others that assumptions are valid is no easy task. People die in war. Thus, acceptance of assumptions can become a highly emotional issue and serve as a significant barrier to consensus. Therefore, advocacy networks must convince communities of practice to accept that

[85] BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.

experimentation sufficiently explored the assumptions required to accept a theory of victory as the chosen ideology.

Experimentation's credibility bolsters support for a theory of victory and wards off criticism. Conversely, a lack of credibility invites criticism and galvanizes opposing constituencies seeking to derail a victory theory. For example, the Joint Forces Command Millennium Challenge 2002 experiment came under enormous scrutiny due to assumptions regarding US capabilities and how the experiment portrayed the enemy. A retired general officer involved in the experiment felt the replication of the enemy forces was not realistic, and the lack of realism gave US forces an unfair advantage. The background did not match reality. His public comments alleging the experiment was rigged created a narrative that attracted attention from defense officials and Congressional members, defeating attempts to build consensus and overshadowing any knowledge generated from the process.[86]

***Rhetoric***

Regardless of experimentation's credibility, to be socially accepted, those who believe in the theory of victory must convince others. Rhetoric, "the branch of language concerned with persuasion," provides the substance for the persuasive narrative that leads outside organizations, groups, and actors to accept one theory of victory over another.[87] Those leading military experiments write reports and distribute findings that carefully select which aspects to share with those outside the process and serve as a virtual witness of what happened and how it happened.[88] Additionally, senior leaders describe the experimentation process before it begins and then selectively use results to persuade audiences. These are not

[86] Micah Zenko, "Millennium Challenge: The Real Story of a Corrupted Military Exercise and Its Legacy," November 5, 2015, https://warontherocks.com/2015/11/millennium-challenge-the-real-story-of-a-corrupted-military-exercise-and-its-legacy/.
[87] Geoffrey Cantor, "The Rhetoric of Experiment," in *The Uses of Experiment*, ed. David Gooding, Trevor Pinch, and Simon Schaffer (Cambridge, UK: Cambridge University Press, 1989), 161.
[88] Ibid., 163.

always part of some published report, but rather senior leader notes communicated across the subsystem to help influence those in a position that matters. The descriptions of the process and the results combine to form rhetoric that advocacy networks use to strengthen the experimentation process's credibility, acceptance of its claims, and support for a theory of victory. For example, following a mid-1990s experiment that involved equipping tanks and other ground vehicles with crude digital command and control platforms, General Fred Franks, the lead for the experiment, informed his superiors: "Convinced that during [Advanced Warfighting Experiment] 94-07 on the NTC battlefield, we wrote the first page of the new book on land warfare."[89] Frank's statement regarding the experiment's results formed the basis of a narrative that other senior leaders who were not at the experiment would use to build support for the Army's efforts.

Rhetoric can be an effective influence tool in the ideological struggle concerning how a military should fight. It generates a common language and set of arguments, designed with an intended audience in mind, that advocates can diffuse throughout the defense policy subsystem. For example, then Chief of Staff of the Army, Gordon Sullivan, used the New Louisiana Maneuvers to advocate for acquisition programs and further investments in experimentation in Congressional hearings.[90] Additionally, the Louisiana Maneuvers Task Force included a plan for how to best communicate the benefits of the Army's experimentation process to external audiences.[91]

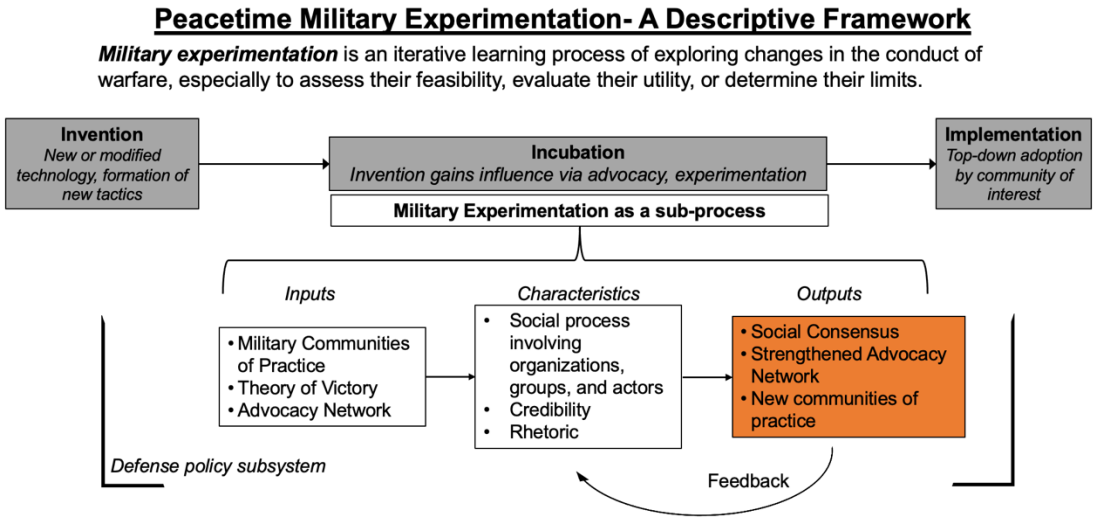
Rhetoric pertaining to experimentation results can be especially effective for those slightly removed from the experimentation effort who cannot personally witness experimentation in action and hold some doubt regarding the validity of a theory of victory.

---

[89] Frederick M. Franks, "Message Traffic From Frederick M. Franks To General Sullivan; General Reimer Regarding AWE 94-07 Hot Wash," April 26, 1994, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/983615/20181815MNBT989112210F401649I011.pdf.
[90] Jensen, *Forging the Sword,* 87-124; COL(R) Michael Harper, interview by Ryan Kendall, August 18, 2021.
[91] Louisiana Maneuvers Task Force, "Louisiana Maneuvers and Force XXI."

As one senior leader indicated, despite his initial obstinance and suspicion of the Army's Force XXI experiments and the associated emphasis on digitization, the overwhelming success the Army kept reporting from the Advanced Warfighting Experiments turned him into a staunch advocate. Reflecting on what he was hearing from senior leaders involved with the experiments, he stated, "I could see it was making progress, and I became a believer. They just kept having success!" The official reporting combined with the testimonies of trusted peers changed his belief in the concept and motivated him to learn more about the ideas associated with the experiments.[92] Rhetoric explaining how the theory of victory is the correct ideology for the future helps slowly build the social consensus required to set conditions for the transition to implementation.

Figure 1.2c: Military Experimentation Framework: Outputs




## A.4 Outputs of Experimentation

Over time, experimentation generates *social consensus* surrounding a theory of victory by replacing a previously accepted ideology with a new one, often with a prototype serving

[92] Interview with Senior General Officer, August 18, 2021.

as a tangible representation of the new way of fighting. This social consensus comes with a *strengthened advocacy network* of sufficient size and strength across the policy subsystem to set conditions for the transition to implementation. As a new social identity emerges with the theory of victory, *new communities of practice* evolve, defining the norms, language, and cognitive models that will shape future innovation activities.

***Social Consensus***

Functionally, experimentation produces new knowledge in the form of a more appropriately defined problem space or potential solutions.[93] However, since peacetime innovation involves an ideological struggle over how a military should fight, experimentation's actual value is its ability to generate social consensus around a theory of victory. Their shared experiences help accelerate consensus-building among those who participate in experimentation. They witness firsthand as a theory of victory transforms into shared practices, goals, and language during experimentation activities. Additionally, thru their participation, they come to believe in the iterative process of refinement. For those not actively participating in experimentation activities, rhetoric spreading through the advocacy network builds consensus. Over time, the organizations, groups, and actors within the policy subsystem accept the knowledge claims that the experimentation process produces to be true, solidifying support for the theory of victory across the policy subsystem. Institutional artifacts, such as new doctrine and prototype organizations, serve as footholds for the transition to implementation. For example, the New Louisiana Maneuvers and Force XXI experiments produced a prototype division complete with advanced digital command and control platforms and new organizational designs. The experiments generated a narrative

[93] Worley discusses the outputs of experimentation but limits his discussion to the functional outputs of knowledge and prototypes. Worley, "Defining Military Experiments," 12.

that helped build consensus around a 21st Century force projection Army that leveraged digital technologies.

***Strengthened Advocacy Network***

Social consensus surrounding a new ideology is the product of an advocacy network that has increased in size and strength since the beginning of the experimentation process. The advocacy network grows from the original core group of organizations, groups, and actors by building weak ties to connect otherwise unconnected innovation entities within the policy subsystem and by connecting with those entities with high betweenness centrality. Those in the advocacy network use strategies of positional legitimation, the acceptance of new ideas by those with formal authority, and brokerage, the diffusion of experimentation's ideas across the network, to extend the size and strength of the network. Furthermore, creating new organizations expands the advocacy network in both size and strength. For example, General Sullivan directed the formation of the Louisiana Maneuver Task Force to organize experimentation efforts within the Training and Doctrine Command. This new organization created new ties to key entities with high centrality, such as the Department of the Army Staff, and weak ties to policy-influencing groups, such as the Association of the United States Army and industry groups. This larger and more robust network not only helps build consensus, but as the innovation process moves into the implementation stage, it continues to garner support for the future development of prototypes.

***New Communities of Interest***

As social consensus emerges around a theory of victory, experimentation produces new communities of interest with defined norms, standards, and practices that support its application. These are either modifications to previous communities or new communities

that emerge. For example, in the Howze Board experiments, previous norms and practices associated with Army aviation changed dramatically to support the use of helicopters in airmobile warfare. Aviation was no longer seen as just a means of transporting forces and equipment around the battlefield. Instead, those inside and outside the community began to see aviation as an integral part of combined arms maneuver.[94] Likewise, after the UPTIDE naval experiments, the Anti-submarine warfare community significantly altered its norms and practices, placing an increased emphasis on deception and evasion.[95]

Similar to those communities that existed before experimentation, these new communities tend to be hierarchical. In the example of airmobile warfare, aviation, infantry, field artillery, and others combined into a hierarchical community. Each sub-community brought its own norms, language, and practices. When applied to airmobile warfare, each community's norms, language, and practices combined into a collective representation of each community. These new norms, language, and practices evolve throughout the experimentation process, helping to shape the new community of practice and those sub-communities within it.

***Feedback loops***

As in a Kuhnian paradigmatic crisis, experimentation does not immediately lead to social consensus. Instead, claims generated by experimentation become socially accepted as constructed beliefs over time. From the beginning of experimentation to the point where institutional focus shifts to implementation, feedback loops within the experimentation process help reinforce knowledge claims and foster support. For example, as part of Force

[94] A summary of the variety of airmobile organizations suggested by the Howze board is available in J.A. Stockfisch, "The 1962 Howze Board and Army Combat Developments" (Santa Monica, CA: RAND Arroyo Center, 1994), 18-23.
[95]Angevine, "Innovation and Experimentation in the US Navy," 93-94.

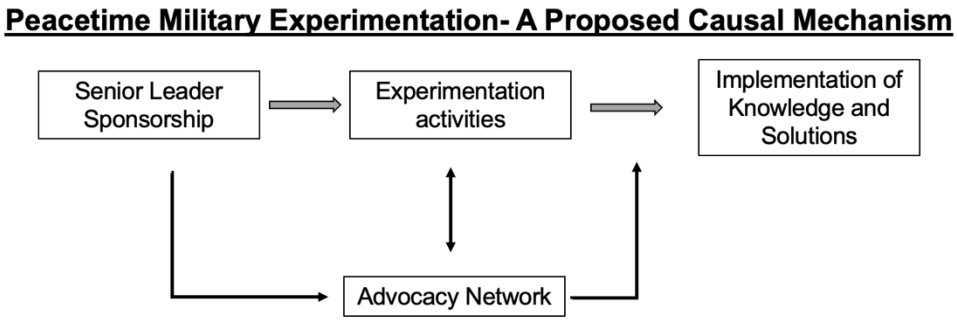
XXI, Sullivan instituted a "Rolling Baseline" concept which used data generated during previous experiments to shape future activities. The Army continued to develop this baseline through a series of feedback loops within its institutional processes, building on data from earlier iterations.[96] This effort served two purposes. Functionally, it helped to distill the information coming out of different experimentation activities. More importantly, it conveyed a level of rigor and status to the knowledge claims, which helped strengthen support for Sullivan's ideas. Feedback loops or processes such as the "Rolling Baseline" provide condensed summaries of experimentation activities to fuel advocacy efforts during in-progress reviews to senior leaders and policymakers while also helping to refine future experimentation efforts.

### B. CAUSAL MECHANISM AND ASSOCIATED VARIABLES

The descriptive framework outlines the different factors associated with peacetime military experimentation. In doing so, the framework identifies a possible causal mechanism at work in the experimentation process. As the framework highlights, peacetime military experimentation is a social process within the defense policy subsystem. Organizations, groups, and actors use experimentation to gain consensus for a theory of victory, influencing the ideological competition Rosen describes. Senior leaders mobilize the necessary resources to begin experimentation, but due to the complexity of the process, their sponsorship is necessary but insufficient to ensure implementation. Instead, advocacy networks must use the experimentation process to galvanize social support for the theory of victory and secure resources for continued experimentation. Figure 1.3 below outlines this possible causal mechanism:

[96] Louisiana Maneuvers Task Force, "Louisiana Maneuvers and Force XXI" (Fort Monroe, VA, n.d.), accessed July 2, 2021.

Figure 1.3: Proposed Causal Mechanism




This causal mechanism isolates four variables from the descriptive framework. First, Senior Leader Sponsorship, an independent variable, pertains to the formal direction from senior military or civilian leaders of a service, the Joint Staff, or the Department of Defense to conduct experimentation or sanction existing experimentation efforts. As described in the military experimentation framework above, senior leader sponsorship is a critical complement to an advocacy network by enabling the positional legitimation strategy. Additionally, senior leader sponsorship helps secure resources for experimentation. However, the formal authority of senior leaders alone cannot win the ideological struggles at the macro and micro levels of the policy subsystem.

Second, Advocacy Network, the independent variable of interest, represents the organizations, groups, and actors that advocate for a theory of victory, attempt to shape the associated experimentation activities, and garner the support necessary to transition to implementation. An advocacy network's strength comes from its ability to distribute information that favors its cause across organizational levels and boundaries within the defense policy system. Those within the network use strategies of positional legitimation, using their position to authorize new ideas, and brokerage, diffusing ideas associated with

experimentation across the policy subsystem. These strategies combine to increase the resonance of the new theory of victory and broaden its acceptance.[97]

Jensen's focus on advocacy networks used in doctrinal change emphasizes the impact of network size and the node position. These factors impact the efficiency with which those within the network distribute information and the networks' ability to establish social ties and overcome physical and social distance. Granovetter's Strength of Weak Ties Theory demonstrates how weak ties rather than strong ties open entities to new information, a critical aspect of Jensen's emphasis on connecting previously unconnected organizations, groups, and actors to more effectively diffuse innovative ideas throughout the institution.[98] Analyzing the position of entities within a network can indicate how often they receive information, what types of information (e.g., novel or redundant) they receive, and when they receive it in relation to others.[99] Jensen's emphasis on positional legitimation strategies draws on this concept, arguing that the credibility of an information source has a value of its own.

Jensen's emphasis on a network's size is helpful, but his analysis falls short of examining other aspects of an advocacy network that should be measured. In addition to weak ties, social network theory offers other considerations such as centrality, which includes degree, betweenness, closeness, and eigenvector. These characteristics are often attributed to a node's power in relation to other nodes within the network.[100] A node with a high measure of betweenness, defined as "the extent to which a particular node lies on the shortest paths between other nodes in the network," sits at an information crossroads with

[97] Jensen summarizes these two legitimation strategies in his discussion of advocacy networks. See Jensen, *Forging the Sword*, 21.
[98] Granovetter, "The Strength of Weak Ties," 1360–80; Jensen, *Forging the Sword*, 20.
[99] Granovetter, "The Strength of Weak Ties," 1170.
[100] Slaughter, *The Chessboard and the Web: Strategies of Connection in a Networked World*, 167-172.

the ability to efficiently distribute ideas and information to multiple nodes.[101] For example, different organizations form the hub of networks inside military services that fulfill a particular function. In the Navy, the Fleet Forces Command is the central hub for readiness and training entities across the Navy. The organization's betweenness enables it to rapidly distribute information to and from various entities. Those with fewer connections into this functional network have less power and must either work through Fleet Forces Command to distribute their information or develop their own connections to entities of interest. Thus, it is logical that for an advocacy network to achieve its objectives, both size and strength are values of interest, and therefore important for measurement.

While the concepts of network theory are useful, the quantitative methods often found in Social Network Analysis go beyond the scope of this study. Instead, this analysis will utilize an ordinal measurement using the definitions and indicators in Table 1 below. These descriptions account for the previously described network theory concepts while supporting the broader research design of this study. Advocacy networks vary in strength across a spectrum of weak, medium, and strong. Table 1.1 below depicts each values' description.

[101] Ibid., 169.

Table 1.1: Advocacy Network Measurement

| | Weak | Medium | Strong |
|---|---|---|---|
| Description | A network with limited weak ties that connect with entities across the policy subsystem and a lack of high centrality entities to control information flow and support network growth. | A network with moderate weak ties that connect with entities across the policy subsystem and limited support from high centrality entities to control information flow and support network growth. | A network with a high number of weak ties that connect with entities across the policy subsystem and support from numerous high centrality entities to control information flow and support network growth. |

The third variable, *Experimentation Activities*, varies from negligible to high, as outlined in Table 1.2 below. For this analysis, a high Experimentation Activities value is a scope condition for the universe of possible cases. High Experimentation Activities represents service-sponsored activities that focus on warfare concepts, including the integration of new technologies and organizational designs. In general, these activities include both virtual and live warfare simulations. These experimentation activities are iterative, take place over a distinct period, and are different than regular training or operational adaptation based on existing doctrine and tactical methods. Experimentation activities require budgetary resources but often do not receive a specific budget allocation but rather utilize other funds to pursue concept development. The duration and scope of these experimentation activities require personnel and organizations from multiple communities, setting the stage for the social process.

Table 1.2: Experimentation Activities Measurement

| | Negligible | Low | High |
|---|---|---|---|
| Description | Limited to no experimentation. Isolated experiments can occur, but they are infrequent and not connected with any learning process beyond the event itself. | Single or infrequent live or virtual experiments that focus on only new technologies or revised organizational designs. Involves limited resources provided by the units involved. | Iterative live and/or virtual experiments that focus on new concepts, technologies, and organizational designs. Includes a significant investment from the Service or Department of Defense in the form of personnel, budgetary resources, and organizations. |

Finally, Transition to Implementation, the dependent variable, describes the ability of the advocacy network to achieve social consensus and its integration of knowledge and solutions into the military organization. Transition to Implementation varies from low to high depending on the degree to which a military organization accepts a theory of victory as its vision of future warfare and how this consensus manifests in tangible results such as prototype organizations and doctrine. The table below outlines the characteristics of each ordinal value.

Table 1.3: Transition to Implementation Measurement

| | Low | Medium | High |
|---|---|---|---|
| Description | Piecemeal acceptance of a limited number of individual technologies; lesser-than prototypes exist but do not mature; rival theories of victory remain popular. | New weapon systems, associated organizations, and doctrine form the core of a prototype; rival theories of victory remain relevant. | Social consensus as demonstrated by new doctrine, prototype organizations, along with requisite materiel and leadership. |

## C. RESEARCH HYPOTHESES

The objective of this dissertation is to answer the research question: Under what circumstances does military experimentation support the transition to implementation of an innovation during peacetime? This dissertation answers this question using one critical assumption and two hypotheses.

First, this dissertation examines the assumption of peacetime military experimentation as a social process within which organizations, groups, and actors influence the ideological competition within a defense policy subsystem to build consensus around a theory of victory. This assumption forms the basis for the previously discussed framework. While its origins are in the sociology of science and technology and military innovation studies, previous efforts focused on specific aspects, such as technological change or the development of shared beliefs resulting from scientific experimentation.[102] This research expands the aperture of their work and applies this perspective to military experimentation within the modern defense policy subsystem. Analyzing military experimentation as a social process provides a new framework for understanding how organizations, groups, and actors construct knowledge and compete in an ideological struggle over what warfare is believed to be. This assumption suggests consensus-building matters more than discovering new data, a very different perspective from existing research that characterizes experimentation as a source of new empirical evidence. Experimentation generates new information, but this alone is insufficient for the experimentation process to support the transition to implementation. The more significant driving force in experimentation is its ability to

[102] Previous works by MacKenzie and Constant bridge the gaps between the sociology of science and technology, military innovation, and experimentation. Constant utilizes Kuhn's sociological analysis of scientific experimentation to posit a theory of technological change in Constant, *The Origins of the Turbojet Revolution*; MacKenzie examines experimentation as a knowledge generation process in MacKenzie, "From Kwajalein to Armageddon? Testing and the Social Construction of Missile Accuracy," and MacKenzie, *Inventing Accuracy*.

generate ideological agreement about a chosen way of fighting and the new metrics to measure success.

This dissertation examined two specific hypotheses based on the framework outlined above:

***Hypothesis 1: Senior leader sponsorship of experimentation is necessary but not sufficient to support innovation.***

*Hypothesis 1* originates from Jensen's analysis regarding the role of senior leaders in creating the space for experimentation to occur and Rosen's findings on intra-service innovation where senior leaders develop incentives for junior officers who subscribe to a particular theory of victory. Jensen's research ties senior leader sponsorship with an advocacy network and sees the two as mutually supporting in the doctrinal change cases he examined. Rosen argues that senior leaders are important for initiating innovation efforts and arranging the structural change required for a theory of victory to take hold. However, without the political influence that an advocacy network generates, the senior leader alone cannot shape the experimentation process in their favor. Leaders find themselves constrained by the very position that is supposed to grant them the authority and power they need to gain support. As with the broader innovation process, they remain shackled by the political forces that surround them. This dissertation expands these findings from previous research by examining the relationship between senior leader sponsorship and experimentation in different contexts and varying levels of advocacy networks.

***Hypothesis 2: The increased size and strength of an advocacy network is associated with a higher probability of transitioning from experimentation to implementation.***

*Hypothesis 2* expands on previous research from Rosen and Jensen regarding peacetime military innovation as an ideological struggle within a military organization. Within these organizations, senior leaders win ideological struggles over how to fight by developing

a theory of victory and institutionalizing promotion paths for those who support their ideas. While Rosen sees this process happening across innovation activities within a service, this dissertation focuses on this concept at the sub-process level of experimentation across the defense policy subsystem. Jensen first applied advocacy networks driving military innovation in his examination of doctrinal change in the US Army. This dissertation examines how advocacy networks use brokerage and positional legitimation strategies to increase the size and strength of the network and build social consensus around a theory of victory, thus setting conditions for the transition to implementation.

# IV. Research Plan and Case Selection

## A. RESEARCH PLAN

### A.1 Design and Methodology

To achieve the research objective, this dissertation uses a case study method to examine the utility of the descriptive framework, validate the critical assumption, and test the two research hypotheses using a common analytical framework. Case study methods provide several advantages. First, the case study method enables the researcher to search for analytical equivalence across different cases where the associated variables do not lend themselves to quantitative measures. For example, peacetime military experimentation and its associated activities are not the same in every case. Depending on the characteristics of the innovation, the resources available, and the different communities associated, experimentation has different aspects that research must compare across different cases. This requires consideration of contextual factors made available through case studies. Second, case studies enable an in-depth examination of causal mechanisms and the contextual factors surrounding them. Innovation processes are inherently complex and

subject to a variety of contextual factors. A case study approach provides the opportunity to explore these contextual factors and identify unforeseen aspects of a mechanism.[103]

Research involving cases that capture the complex interactions associated with social processes, such as experimentation, benefits from process-tracing. Process-tracing as a method for within-case analysis offers an alternative for making causal inferences when a controlled comparison of cases is not feasible.[104] Process-tracing also facilitates strengthening the internal validity of each case. As Andrew Bennet points out, process-tracing closely parallels Bayesian inference, relying on diverse evidence for each case to examine potential competing explanations and omitted variables.[105] This dissertation combines the case study method with process-tracing to investigate the utility of the descriptive framework, validate the critical assumption, and test the two research hypotheses using a common analytical framework.

**A.2 Scope**

The scope of this dissertation is limited to cases that meet the following criteria. First, the research question applies to peacetime innovation. While a full debate regarding the differences between wartime and peacetime conditions is beyond the scope of this dissertation, it is necessary to address some general characteristics. In this dissertation, peacetime includes periods with operational deployments and the limited application of military power. During these periods, the use of military power is usually referred to as campaigns or contingency operations, such as in Bosnia and Kosovo.

---

[103] Alexander L. George, *Case Studies and Theory Development in the Social Sciences*, BCSIA Studies in International Security (Cambridge, Mass: MIT Press, 2005), 19-22.
[104] Ibid., 214.
[105] Andrew Bennett, "Qualitative Methodologies," *The Encyclopedia of Political Science* 4 (2011): 1401–4.

In contrast, wartime includes those periods when US military organizations conduct sustained combat operations against enemy forces involving a significant deployment of US military power. While these periods may not include an official declaration of war by the US Congress, these instances are generally referred to as wars, such as the Gulf War and the wars in Afghanistan and Iraq. The first two cases in this dissertation (Chapters 2 and 3) meet this condition. However, the Joint Forces Command case (Chapter 4) begins during peacetime and ends between the beginning of the US wars in Afghanistan and Iraq. While this case does not explicitly occur during peacetime, as the case analysis demonstrates, the experimentation process continued to focus on future conflicts rather than the war in Afghanistan.

Second, the cases occur solely within the US military due to the unique nature of the US political system and the interrelationships and authorities of different policymaking institutions. Third, as previously mentioned, each case involves a high Experimentation activities measurement, indicating these cases involve significant investment from the Service or Department of Defense in the form of personnel, budgetary resources, and organizations. Fourth, the experimentation process in these cases focuses on more than experiments with new technologies. Instead, experimentation must also include new concepts, organizations, and/or equipment. Finally, cases will come from the post-World War II period to better represent the current policy subsystem and increase the universe of possible cases to expand beyond the conventional inter-war experimentation examples.

Using these scope criteria, the following table outlines potential case studies and the variation associated with the variables previously described.[106]

[106] Alexander George emphasizes the importance of highlighting a potential universe of cases as part of research design and theory development. George, *Case Studies and Theory Development in the Social Sciences*, 83.

Table 1.4: Potential Peacetime Experimentation Case Studies

| | Senior Leader Sponsorship | Advocacy Network (IV) | Transition to Implementation (DV) |
|---|---|---|---|
| Air Mobile Infantry (Army) | High | Strong | High |
| Assault Breaker (DoD) | High | Medium | Medium |
| Sea Dragon (USMC) | High | Medium | Low |
| Fleet Battle Experiments (Navy) | High | Medium | Low |
| UPTIDE (Navy) | High | Strong | High |
| Motorized Division (Army) | High | Weak | Low |
| New Louisiana Maneuvers/Force XXI (Army) | High | Strong | High |
| Army After Next (Army) | High | Low | Low |
| Millennium Challenge (Joint) | High | Strong | Low |

## B. CASE SELECTION

Several considerations guide the selection of case studies from this list. John Gerring points out that case selection attempts to achieve two different objectives. First, cases should identify the relevant causal elements of the larger population, making the selection as representative as possible. Second, cases should provide variation within the associated areas

of theoretical interest to maximize the causal leverage of the study.[107] To achieve these two objectives, Gerring offers nine case selection techniques that provide different approaches to case selection based on the available population and intended use.

For this dissertation, the diverse case technique offered the best opportunity to examine the causal mechanism to achieve both the representativeness and causal leverage objectives, while also facilitating hypothesis testing. Capturing the full range of variation in the *Advocacy Network* and *Transition to Implementation* variables results in one case with low measures for both the *Advocacy Network* and *Transition to Implementation*, and one case with a strong *Advocacy Network* and a high *Transition to Implementation.*[108] An additional benefit of this variation is that it mitigates the risk of undersampling bias. Selecting cases with variation in the dependent variable makes any inferences from the cases more representative of the population than if the dissertation only examined positive cases.[109]

In addition to diverse cases, cases that result in surprising outcomes relative to the expected causal mechanism, what Gerring refers to as deviant cases, provide opportunities to examine other possible explanations. Although not suitable for testing hypotheses, deviant cases offer the opportunities to identify new explanations or previously unknown variables.[110] Deviant cases are best paired with process-tracing and are useful for developing contingent generalizations that suggest when alternative outcomes occur.[111]

Furthermore, to increase the potential for limited external validity inferences, the selected cases should control for existing rival hypotheses as much as possible. For example,

---

[107] John Gerring, *Case Study Research: Principles and Practices* (New York, NY: Cambridge University Press, 2007), 88.

[108] Gerring discusses the diverse case technique and its advantages for hypothesis testing in Chapter 5 of Gerring, *Case Study Research: Principles and Practices*, 97-101.

[109] Dan Slater and Daniel Ziblatt, "The Enduring Indispensability of the Controlled Comparison," *Comparative Political Studies* 46, no. 10 (October 2013): 1301; Barbara Geddes, "How the Cases You Choose Affect the Answers You Get: Selection Bias in Comparative Politics," *UC Berkeley Working Papers*, 1990.

[110] Gerring, *Case Study Research,* 105-108.

[111] George, *Case Studies and Theory Development in the Social Sciences*, 215-16.

comparing diverse cases with the same value of senior leader sponsorship reduces the possibility that senior leader sponsorship could present a rival hypothesis to the hypotheses of interest.[112]

Finally, as discussed above, process-tracing is most effective when there is sufficient evidence to support the examination of the causal mechanism and operationalize and measure the associated variables. Furthermore, using the defense policy subsystem requires evidence that indicates the interactions of multiple actors, groups, and organizations beyond the immediate vicinity of the experimentation process. Therefore, case selection has to account for those cases that provide sufficient evidence to support the research design. The limited access to archives, including the National Archives and the Presidential libraries, made this consideration an even more important one than usual. Fortunately, some archives, such as the US Army Heritage and Education Center remained open, albeit with limited access.

Given these considerations, Table 1.5 below outlines the three case studies this dissertation examines in-depth: two diverse cases, the Army's 9th Infantry Division and the Motorized Concept of the 1980s, the Army's New Louisiana Maneuvers and Force XXI experiments of the 1990s, and a deviant case, the Joint Forces Command's joint experimentation in the late 1990s and early 2000s. The table also highlights the three additional cases briefly explored in the conclusion to examine the potential generalizability of the results.

[112] Slater and Ziblatt, "The Enduring Indispensability of the Controlled Comparison," 1313.

Table 1.5: Proposed Case Studies and Associated Characteristics

| | Organization level | Innovation approach | Advocacy Network | Strategic Context | Organizations, Groups, and Actors | Transition to Implementation |
|---|---|---|---|---|---|---|
| Motorized Division (Army) | Service | Top-down / Bottom-up | Weak | Cold War | 9th ID, High Technology Test Bed; Army Staff, Industry | Low |
| New Louisiana Maneuvers/ Force XXI (Army) | Service | Top-down | Strong | Post-Cold War | NLM Task Force; Congress; Contractors; Experimental Force | High |
| JFCOM Joint Experimentation / Millennium Challenge | Joint | Top-down | Strong | Post-Cold War | JFCOM; DoD; Congress; Services; Contractors; Media | Low |
| | Additional Cases | | | | | |
| Assault Breaker | Joint | Top-down | Medium | Cold War | Services; DARPA; DoD; Congress | Medium |
| UPTIDE (Navy) | Service | Bottom-up | High | Cold War | Sub-communities; Service; Contractors | High |
| Air Mobile Infantry (Army) | Service | Top-down | High | Cold War | Howze Board / 11th Air Assault; DoD; Industry | High |

The Motorized Division and New Louisiana Maneuvers/Force XXI cases provide diverse cases representing two different values of the variable of interest, *Advocacy Network*, and two different values of the dependent variable, *Transition to Implementation*.[113] Additionally, both cases are Army experimentation cases. The accessibility of the Army Heritage and Education Center and the author's knowledge of the associated organizations and Service culture ensured a sufficient amount of evidence for the chosen research design. Finally, the Joint experimentation / Millennium Challenge case offers a deviant case for

[113] Gerring outlines techniques associated with cross-case analysis of diverse cases where both the variable of interest and dependent variable vary; Gerring, *Case Study Research: Principles and Practices*, 97-101.

potentially refuting the propositions, identifying new variables of interest, or offering alternate hypotheses.[114] While not fully developed case studies, the additional cases help explore alternative explanations while supporting findings from the primary case studies.

### C. A NOTE ON INTERVIEWS

In addition to archival documents, this dissertation utilized more than 70 semi-structured interviews using questions derived from the experimentation framework and the two hypotheses. While the COVID pandemic presented some challenges to this project, it also presented opportunities. The increased use of video conferencing platforms and the access to key individuals through networking platforms like LinkedIn made interviewees more accessible and more willing to use technologies that facilitated interviews despite significant geographic separation. Absent these two factors, this project would not have benefited from the human stories that came from these interviews.

[114] Gerring defines a deviant case as "a case exemplifying deviant values according to some general model"; Gerring, *Case Study Research: Principles and Practices*, 213.

# CHAPTER TWO: 9TH INFANTRY DIVISION AND THE MOTORIZED CONCEPT: SPONSORSHIP AND A WEAK ADVOCACY NETWORK

> He [Meyer] has trusted us with the greatest empowering experience in a lifetime. It will never come again in this huge bureaucracy where the CSA will take something out of FORSCOM and TRADOC and give it to a division.
>
> MG Robert Elton, 9th ID Commanding General[115]

## I. Introduction

The Army's 9th Infantry Division motorized experiments in the early 1980s provide a case where high senior leader sponsorship and a weak advocacy network during the experimentation process failed to support the transition of an innovation to implementation. External events in 1979 led the Chief of Staff of the Army, General Edward Meyer, to pair the 9th Infantry Division (ID) with a High Technology Test Bed to experiment with a light division that could fight like a heavy division. Experimentation produced a motorized infantry concept that utilized speed, decentralized command and control, and precision weapons instead of mass and armored protection. However, experimentation met resistance because it threatened the existing initiatives of the Army's combat developments organization and the readiness requirements required to meet existing operational demands. Without an associated advocacy network, the motorized concept failed to gain external support despite a series of successful evaluations and certifications. As a result, the Division remained in its interim design, relying heavily on surrogate equipment until it transitioned to mechanized infantry in 1989.

The following chapter examines this case study using the peacetime military experimentation framework to understand how a weak advocacy network impacts the

[115] Report Regarding Oral History for Robert Elton, interview by Lieutenant Colonel Joseph W. Trez, Robert Elton Papers; Box 2, Oral History, U.S. Army Heritage and Education Center, 184-185.

transition to implementation as part of the posited causal mechanism. The following sub-section provides a background of the case study and summarizes the causal mechanism and its associated context. The second section examines the experimentation framework and the impact of the advocacy network as it increased in size and strength over time. The final section discusses the associated findings and conclusions.

## BACKGROUND

External events in 1979, such as the Soviet invasion of Afghanistan, increased interest within the Carter Administration for military options to address contingencies outside of Europe. In response to this requirement, Chief of Staff of the Army (CSA) General Meyer envisioned a new type of light division that retained the strategic flexibility required for force projection and had the lethal capabilities to fight like a heavy division. He paired the 9th Infantry Division with a High Technology Test Bed (HTTB) at Fort Lewis, Washington, to operationalize this theory of victory.

The 9th Infantry Division used an iterative concept development and experimentation process to develop a motorized infantry concept that utilized speed, decentralized command and control, and precision weapons to fight and win in contingency operations against armored and light infantry forces. Early experimentation relied on unconventional surrogate technologies, such as Remotely Piloted Vehicles (RPVs) and Fast Attack Vehicles (FAVs), acquired through the HTTB's non-standard acquisition process. Officers paired these technologies with new concepts and organizations, such as Light Attack Battalions, creating an organization unlike any other in the Army.

Meyer's sponsorship helped generate early momentum and support from Department of Defense officials, Allies, and sister services. However, the 9th ID's disruptive concepts created instability within existing communities of practice that reflected the

interests of the Army's major headquarters. For example, the Army Forces Command (FORSCOM) leadership viewed experimentation as a distraction from the 9th ID's requirement to maintain readiness for operational missions.[116] Additionally, the Training and Doctrine Command (TRADOC) and Army Materiel Development and Readiness Command (DARCOM) leaders saw the 9th ID and the HTTB as irritants and an afront to their existing programs and analytical models.[117] Without these leaders championing the 9th ID's experimentation efforts, the Division leaders struggled to extend their advocacy network and diffuse their ideas across the defense policy subsystem.

While Meyer's successor, General John Wickham, continued to support the 9th ID, he also instructed TRADOC to design a more politically palatable regular infantry division design, known as the 10K Light Division.[118] This parallel effort exacerbated the existing tensions with the Army's major headquarters, leaving the 9th ID wedged in between two competing theories of victory, the existing mechanized divisions in Europe and the complimentary light infantry division. Despite a robust experimentation process that included successful external evaluations, consensus surrounding the 9th ID's motorized concept remained isolated to the Division and small pockets within the branch proponents. The 9th ID failed to build advocacy with critical elements, most notably Congress, which impacted support for the equipment the Division needed to employ its concept effectively. Without this equipment, the Division continued to rely on surrogate equipment, which damaged its external credibility, further hampering its ability to obtain support.

---

[116]Report Regarding Oral History for Robert Elton, interview by Lieutenant Colonel Joseph W. Trez, Robert Elton Papers; Box 2, Oral History, U.S. Army Heritage and Education Center, accessed November 16, 2021, https://emu.usahec.org/alma/multimedia/902246/20182354MNBT1036357282F268628I001.pdf, 205.

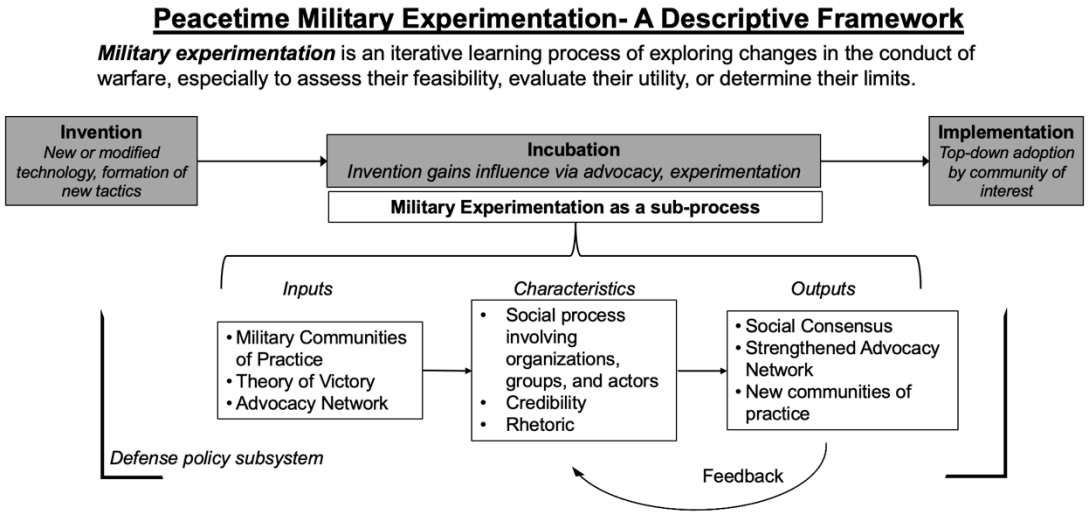
[117] Interview with GEN(R) Robert W. RisCassi, interview by Ryan Kendall, June 3, 2021.

[118] General Wickham continued to advocate for the 9th ID and its concepts through regular IPRs, garnering support for acquisition programs, and hand-picking the 9th ID commander.

General Wickham approved the Division's motorized concept and associated organizational design in 1985, but the Division remained reliant on more than 18 types of surrogate equipment. Without the support of key actors and organizations, the 9th ID failed to develop a new community of practice and the required social consensus around its ideas. As a result, the Division remained in its interim configuration, a lesser form of the motorized division, until 1988, when it transitioned to a standard mechanized infantry division until its deactivation in 1991.

## II. Applying the Framework

Figure 2.1: Peacetime Military Experimentation Framework




The following subsections use the peacetime military experimentation framework above (see Figure 2.1) to examine the experimentation process. First, an overview of the defense policy subsystem during the late 1970s and early 1980s highlights key external events and internal parameters which shaped the policy subsystem. The following subsection examines the inputs to the experimentation process leading up to Meyer's pairing of the

High Technology Test Bed (HTTB) with the 9th ID. The third subsection discusses the characteristics of experimentation, focusing on the 9th ID's experimentation and concept development. The fourth subsection analyzes the outputs of experimentation. Finally, an ongoing assessment of the proposed causal mechanism occurs throughout each portion of the process.

## A. DEFENSE POLICY SUBSYSTEM

### A.1 External Events

External events shaped the defense policy subsystem in three ways leading up to June 1979 when General Edward Meyer became the Chief of Staff of the Army. First, the end of the Vietnam War brought with it the creation of the All-Volunteer Force (AVF) to address the crisis of professionalism within the military and the domestic opposition to the draft. The establishment of the AVF created readiness challenges which remained a key policy topic well into the early 1980s.[119] Second, the Arab-Israeli War of 1973 demonstrated to Army leadership that new technologies and the interaction of multiple weapons systems had increased the lethality, speed, and complexity of the modern conventional battlefield. Army leaders used the results of the Arab-Israeli War to advocate for reforms in doctrine, training, and equipment necessary to compete with the Soviet Union.[120]

Finally, although post-Vietnam US defense policy focused heavily on Central Europe, the US faced increasing challenges to its interests in other parts of the world. Early in 1979, the Iranian revolution replaced a US-friendly regime in the Middle East with an anti-

[119] The AVF remained a policy focus for General Meyer throughout his tenure. For example, Meyer emphasizes the importance of this issue and its associated policies towards the end of his term as CSA in his 1982 article, Edward C. Meyer, "Today's Army and Its Progress," *Defense 82 Magazine*, April 1, 1982.

[120] Bronfeld argues the Arab-Israeli War was used as an advocacy tool by General Depuy to secure additional resources and drive revisions in doctrine and training within the Army. Saul Bronfeld, "Fighting Outnumbered: The Impact of the Yom Kippur War on the U.S. Army," *The Journal of Military History* 71, no. 2 (2007): 465–98, https://doi.org/10.1353/jmh.2007.0096, 468.

US power. This dramatic change amplified instability within the region and posed a significant threat to the interests of the US and its allies. Additionally, the Soviet Union's invasion of Afghanistan in late 1979 demonstrated the Soviet Union's willingness to project power into its near abroad, increasing the probability of Soviet excursions deeper into more strategically sensitive areas such as the Persian Gulf region. Finally, the 1979 Sandinista Revolution increased US concerns about communist expansion in Central America, creating challenges for already limited defense policy options.[121] As a result, earlier Carter Administration efforts to develop contingency forces accelerated. The need to focus on other priorities besides deterrence in Europe became increasingly apparent to defense policy officials.[122]

### A.2 Internal Parameters

Four factors defined the internal parameters of the defense policy subsystem leading up to 1979. First, the Army had recently completed a significant organizational reform to prepare itself for the post-Vietnam era. The Department of Defense's desire for cost-saving

---

[121] Edward C. Keefer, *Harold Brown: Offsetting the Soviet Military Challenge 1977-1981*, Secretaries of Defense Historical Series, volume 9 (Washington, DC: Historical Office, Office of the Secretary of Defense, 2017), 91-100.

[122] The Carter Administration's US National Strategy, published in 1977, identified the need for military options capable of addressing contingencies outside of a conflict on the plains of Europe. Specifically, the strategy identified the need for "a deployment force of light divisions with strategic mobility independent of overseas bases…which includes moderate naval and tactical air forces, and limited land combat forces." The administration's subsequent addendums, PD/NSC-62 and 63, published in early 1981, reflect the degree to which these events collectively impacted national security policy and accelerated the need for a military force capable of responding to contingencies involving either Soviet forces or surrogates across the globe. These addendums serve as evidence of the degree that the 1979 events reoriented the needs and requirements of the defense policy subsystem. See Jimmy Carter, "Presidential Directive/NSC-18 Subj: U.S. National Strategy," August 24, 1977, Jimmy Carter Presidential Library and Museum, https://www.jimmycarterlibrary.gov/assets/documents/directives/pd18.pdf, Jimmy Carter, "Presidential Directive PD/NSC-62 Subj: Modifications in U.S. National Security Strategy," January 15, 1981, Jimmy Carter Presidential Library and Museum, https://www.jimmycarterlibrary.gov/assets/documents/directives/pd62.pdf and Jimmy Carter, "Presidential Directive/NSC-63 Subj: Persian Gulf Security Framework," January 15, 1981, Jimmy Carter Presidential Library and Museum, https://www.jimmycarterlibrary.gov/assets/documents/directives/pd63.pdf.

efficiencies, the return of forces from Vietnam, the AVF individual training requirements, and the need to streamline modernization efforts contributed to General Abrams' significant organizational changes as part of Operation Steadfast in 1973.[123] The Army created two new service level organizations, Training and Doctrine Command (TRADOC) and Forces Command (FORSCOM), each commanded by a four-star general.[124] TRADOC's primary missions were to manage the Army's initial entry training, concept development, and professional military education. TRADOC contained numerous sub-organizations, including the Combined Arms Center at Fort Leavenworth, Kansas, and the more than 25 individual branch schools and proponents. FORSCOM included all the active and reserve units within the Continental United States, including the 9th ID. Its mission centered on readiness and providing trained forces to combatant commanders.

These organizations interacted with two other service level entities, the Headquarters of the Department of the Army (HQDA) and the United States Army Materiel Development and Readiness Command (DARCOM), to fulfill the Army's Title 10 responsibilities. HQDA served as the executive agent for policies that impacted the entire force, including force structure allocation and personnel management. DARCOM, on the other hand, focused on the development and acquisition of equipment in support of emerging and future demands. DARCOM's efforts during the late 1970s involved several critical pieces of equipment, such as the XM1 tank and the Apache helicopter, and resourcing the supply chains for existing equipment. In addition, DARCOM's testing and

[123] For a complete historiography of the planning and implementation of Operation Steadfast see Jean R. Moenk, "Operation Steadfast Historical Summary: A History of the Reorganization of the U.S. Continental Army Command (1972-1973)" (U.S. Army Forces Command, October 1, 1974), U.S. Training and Doctrine Command, https://www.tradoc.army.mil/wp-content/uploads/2020/10/p4013coll11_1957-Operation-STEADFAST-Moenk.pdf.

[124] For a summary of TRADOC's establishment and early efforts to reform training, doctrine, and concept development, see Paul H. Hebert, *Deciding What Has to Be Done: General William E. Depuy and the 1976 Edition of FM 100-5, Operations*, Leavenworth Paper, No. 16 (Ft. Leavenworth, VA: Combat Studies Institute, Command and General Staff College, 1988).

development organizations ensured the Army adhered to the Congressional budgetary justification requirements. These four organizations represented significant bureaucratic power centers that would impact any innovation attempts, positively or negatively, within the Army.

Second, although the Army reformed its internal organizations, the authorities and responsibilities of the House and Senate Armed Services Committees remained consistent from their Vietnam-era positions. Much of the Army's interactions with Congress leading up to this time hinged on the AVF implementation, its impacts on readiness, and modernization programs. For example, early in his tenure, General Meyer advocated for numerous personnel initiatives that focused on attracting and retaining the talent required to fill positions within the AVF. His characterization of the Army as a "hollow force" represented the severity of the Army's personnel challenges and served as a significant policy discussion point for future interactions with Congress.[125] Additionally, weapons programs such as the XM1 main battle tank and the Infantry Fighting Vehicle (IFV) received significant attention from Congress, primarily due to Congressional concerns about cost overruns.[126] These policy topics emphasized the continued importance of Congress' role in the defense policy subsystem.

Third, the Carter Administration's US National Strategy, published in 1977, identified the need for military options capable of addressing contingencies outside of a conflict on the plains of Europe, most likely in the Middle East and East Asia. Specifically, the strategy identified the need for "a deployment force of light divisions with strategic

---

[125] Meyer used this term initially in testimony to the House Armed Services Committee. References to a "hollow force" remained part of his testimony to Congress and his interactions with the press throughout his tenure as Chief of Staff of the Army. Edward C. Meyer, "Hearing Before the House Armed Services Committee, Subcommittee on Personnel on the New Educational Assistance Program," in GEN(R) Edward C. Meyer, *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983* (Washington, D.C.: Department of the Army, 1983), 92.

[126] Interview with LTG(R) John H. Moellering, interview by Ryan Kendall, Phone, October 13, 2021.

mobility independent of overseas bases…which includes moderate naval and tactical air forces, and limited land combat forces."[127] In response, the Army identified a Unilateral Corps focused on global contingencies, which later evolved into the Rapid Deployment Force.[128] The administration's subsequent addendums, PD/NSC-62 and 63, published in early 1981, reflect how these events collectively impacted national security policy and accelerated the need for a military force capable of responding to contingencies involving either Soviet forces or surrogates across the globe. These addendums prioritized, among other things, increased military readiness budgets and improvement of "strategic lift and general-purpose forces in the Five-Year Defense Program."[129] These addendums serve as evidence of the degree that the 1979 events expanded the internal parameters of the defense policy subsystem to include global contingency operations.

Finally, previous inter-service policy competition led to lobbying groups that connected multiple organizations, groups, and actors within the defense policy subsystem, such as service leaders, politicians, journalists, and defense industry companies. For example, the Association of the United States Army (AUSA), founded in 1950, effectively lobbied for the service's interests. The annual AUSA convention provided a venue for organizations, groups, and actors within the defense policy subsystem and Army senior leaders to interact and share ideas. These conventions enabled the Army to "gain the ear of influential opinionmakers and express [the Army's] views on defense issues."[130] Additionally, its

---

[127] Jimmy Carter, "Presidential Directive/NSC-18 Subj: U.S. National Strategy," August 24, 1977, Jimmy Carter Presidential Library and Museum, https://www.jimmycarterlibrary.gov/assets/documents/directives/pd18.pdf, 4.

[128] GEN(R) Edward C. Meyer, "Pentagon Press Conference, Washington, DC, 17 September 1979," in *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983* (Washington, D.C.: Department of the Army, 1983), 16-18.

[129] Jimmy Carter, "Presidential Directive PD/NSC-62 Subj: Modifications in U.S. National Security Strategy," January 15, 1981, Jimmy Carter Presidential Library and Museum, https://www.jimmycarterlibrary.gov/assets/documents/directives/pd62.pdf.

[130] Bacevich, *The Pentomic Era: The U.S. Army Between Korea and Vietnam*, 24.

professional magazine, Army, provided a platform for the Army's needs.[131] Similar groups existed within the other services, such as the Association of the United States Navy (AUSN). Their increased activity in support of their respective constituents enlarged the defense policy subsystem to include these policy-influencing organizations.

## B. EXPERIMENTATION INPUTS

The combination of an existing community of practice, Meyer's sponsorship for experimentation and his positing of a new theory of victory, and the core advocacy network set conditions for the experimentation process. As demonstrated in the paragraphs below, Meyer's efforts to develop "the other Army" ran counter to the conventions established by the existing military community of practice which had previously focused its analytical efforts within TRADOC. However, he believed his senior sponsorship, combined with the core advocacy network supporting experimentation efforts, would facilitate the development of innovative concepts that addressed the Army's strategic challenges.

### B.1 Military Communities of Practice

#### *Mechanization and Division 86*

In the years following Vietnam, defense professionals concerned with the increased lethality of the battlefield and advancements in Soviet military capabilities formed a new military community of practice centered on mechanized forces capable of conducting combined arms maneuver against the Soviet Union in Central Europe. First, from the Arab-Israeli War, Army senior leaders concluded that the battlefield of the future included a "marked advance in the lethality of fire, the more rapid attrition of materiel, the faster tempo

[131] Horn discusses the role of AUSA in previous budgetary and policy battles, such as the development of Army aviation in Carl J. Horn, "Military Innovation and the Helicopter: A Comparison of Development in the United States Army and Marine Corps, 1945-1965" (The Ohio State University, 2004), 176.

of battle, and the essentiality of better training, tactics, terrain use, and combat arms coordination."[132] The increased lethality and tempo, combined with a reluctance on either side to engage in nuclear war, would cause engagements to be quick and decisive. As this new battlefield emerged, Army leaders increasingly saw the importance of highly trained mechanized infantry and armor as part of a combined arms force.

Second, senior national security officials became increasingly concerned that while the US was preoccupied with Vietnam, the Soviet Union had modernized its strategic and tactical forces. President Ford emphasized this challenge in his 1977 State of Union address:

> The war in Indochina consumed enormous resources at the very time that the overwhelming strategic superiority we once enjoyed was disappearing. In past years… our strategic forces leveled off, yet the Soviet Union continued a steady, constant buildup of its own forces.[133]

Ford noted that with US and Soviet strategic capabilities in a state of equilibrium, the risk of conflict below the nuclear threshold only increased.[134] With an increased risk of conventional warfare, US concerns of neglected NATO and US conventional forces caused defense policymakers to view policy and budgetary matters through the lens of fighting the Soviet Union in Central Europe.[135]

In post-Vietnam Army, TRADOC spearheaded reform efforts to address these two concerns. Senior Army leaders such as General William DePuy, who believed the modern battlefield was changing, used the results of the Arab-Israeli War of 1973 to justify their

---

[132] Romjue, John L. Romjue, *A History of Army 86, Division 86: The Development of the Heavy Division, September 1978-October 1979*, vol. I, II vols., TRADOC Historical Monograph Series (Ft. Monroe, VA: Historical Office, HQ TRADOC, 1982), 2.

[133] Gerald R. Ford, "President Gerald R. Ford's Address Before a Joint Session of the Congress Reporting on the State of the Union," Gerald R. Ford Presidential Library and Museum, January 12, 1977, https://www.fordlibrarymuseum.gov/library/speeches/761057.asp.

[134] Ford, "President Gerald R. Ford's Address Before a Joint Session of the Congress Reporting on the State of the Union."

[135] Keefer outlines the extensive analysis concerning NATO forces and the US/Soviet conventional force imbalance in Keefer, *Harold Brown: offsetting the Soviet military challenge 1977-1981*, 417-454.

perspective.[136] The Army's analysis of the conflict provided rhetoric that leaders socialized throughout Army, Defense, and Congressional circles, effectively connecting their burgeoning ideas and supporting evidence with entities across the defense policy subsystem.[137] Furthermore, lessons learned from the Arab-Israeli war sparked a doctrinal renaissance, with each iteration prioritizing mechanized forces and the Soviet threat in Central Europe. The TRADOC Commander who followed DePuy, General Donn Starry, led a series of analytical efforts to redesign the Army division and create a new maneuver warfare doctrine, Air Land Battle. TRADOC concept developers utilized an analytical frame known as the Battlefield Development Plan (BDP) as part of this analysis process. Planners saw the BDP "as a basis for setting priorities and for influencing planning, programming, and budgeting by the Department of the Army."[138]

Using this analytical frame, General Starry and his TRADOC planners developed the Division 86 organizational design, "described as the future point by which doctrine, organization, training, and training literature could be pointed toward the newly incorporated weaponry and equipment."[139] Division 86 provided the analytical foundation for an armored division optimized with new equipment scheduled to be in the Army in 1986 and capable of executing the emerging Air Land Battle concept. In line with this work on Division 86, TRADOC announced it would continue with further development of similar designs for three separate light divisions: infantry, airborne, and air assault.[140] Division 86, both the final

---

[136] Bronfeld makes this argument in his analysis of DePuy's ideas prior to the Arab Israeli war in Saul Bronfeld, "Fighting Outnumbered: The Impact of the Yom Kippur War on the U.S. Army," *The Journal of Military History* 71, no. 2 (2007): 465–98, https://doi.org/10.1353/jmh.2007.0096, 472-473.

[137] Romjue, *A History of Army 86, Division 86: The Development of the Heavy Division, September 1978-October 1979*, 2.

[138] Ibid., 14.

[139] Ibid., 17.

[140] Joe D. Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983* DRAFT, vol. I (Fort Lewis, WA: I Corps, 1984), 2-3.

product and the process that brought it about, would serve as the stepping-off point for these future studies.

The Division 86 and Air Land Battle analytical work served as the foundation for a new community of practice, complete with shared norms, beliefs, and conventions. TRADOC and its leadership were at the community's center, and the community's influence extended into Congress and the Department of Defense. TRADOC provided the bureaucratic mechanisms to formalize the community within the Army and extend its influence. The Army's focus on defeating Soviet forces in Central Europe engendered support among civilian leadership and Congress for key modernization priorities such as the XM1, the Advanced Attack Helicopter, and the Infantry Fighting Vehicle. Furthermore, whether out of a desire for budgetary efficiency or belief in the changes to the modern battlefield, Secretary of Defense Harold Brown favored the mechanization of land forces. As evidence, Secretary Brown made efforts to mechanize all but one of the active Army divisions, sparing the 82nd Airborne as a specialized airborne division.[141]

Within this community of practice, TRADOC carried significant weight, defining the doctrine, organizational design, and weapons programs required to fight and win. Moreover, TRADOC's outsized role connected it to other major commands, such as DARCOM and FORSCOM, key staff agencies, such as HQDA, and senior leaders, such as the Chief of Staff of the Army and Under Secretary of Defense for Research and Engineering, William Perry. Since TRADOC had played such a pivotal role in redefining the Army from the end of the Vietnam War through 1979, any innovation attempts would need its support.

---

[141] Edward C. Meyer, Interview with GEN Edward C. Meyer, interview by Keith Nightingale, 1988, Edward C. Meyer Papers, Senior Officers Oral History Program Project, Box 1, U.S. Army Heritage and Education Center, 270.

***Branch Proponents***

The Mechanization and Division 86 community of practice served as an aggregation of multiple sub-communities of practice, such as infantry, armor, and aviation. Within the TRADOC organizational structure, branch proponents provided branch-specific training, professional development, and certification. Additionally, proponents played an outsized role in writing requirement documents, the bureaucratic process for designing new organizations, and procuring equipment. While collectively the proponents shared similar beliefs, conventions, and norms, branch interests sometimes conflicted with the larger Mechanization and Division 86 community of practice. For example, the armor branch viewed all problems through the lens of mechanized warfare, specifically tanks. In contrast, the infantry branch could see the utility in both mechanized units and non-mechanized units based on the infantry's historically varied roles. As a result, these branch proponents formed sub-communities of practice that, at times, held different belief structures than the larger aggregated mechanized community.

Additionally, each branch proponent community had ties to different industries that built the equipment associated with its combat formations and the DARCOM organization responsible for managing the program. The Army's modernization efforts connected branch proponents, DARCOM, and defense industry partners such as Chrysler, Hughes, and Sikorsky. Each weapons system program also brought came with the interests of the Congressional members whose districts included the manufacturing plants, supply lines, and testing facilities. However, despite the increased role of industry partners, the regulatory and legal requirements related to the acquisition process curbed their direct influence and limited the number of entry points during the policymaking process. These legal requirements would become significant impediments to any innovations that required off-the-shelf prototype equipment from outside existing programs.

***Testing and Development Community***

Until the 9th ID's experimentation efforts, most of the Army's testing, evaluation, and experimentation took place within subsidiary organizations of TRADOC and DARCOM. Through experience, these organizations had become intimately familiar with Congressional requirements for procurement. Many of the mid-level leaders within these organizations were from an operations research background. They, therefore, had well-defined conventions, norms, and beliefs regarding rigor associated with experiments and tests. These conventions, norms, and beliefs often conflicted with those of the practitioners. Practitioners, such as combined arms officers and soldiers, often favored a seventy percent solution that worked in field exercises rather than what they regarded as the overly stringent lock-step testing process.[142] While this community would challenge experimentation practices outside of its conventions, it often lacked the bureaucratic power to overcome significant senior sponsorship. The Testing and Development community did not organize around any theory of victory. Instead, it played more of a spoiler role, overseeing the credibility of the associated experimentation and advising leaders when the process appeared to lack the rigor required to withstand Congressional scrutiny.

**B.2 Senior Leader Sponsorship and a Theory of Victory**

President Carter selected General Edward Meyer to serve as the Chief of Staff of the Army (CSA) in 1979. Meyer jumped ahead of more than ten general officers and, at the age of 50, was one of the youngest CSAs in history.[143] While Meyer's efforts at the beginning of his term focused on personnel recruitment and retention, the events of 1979 stimulated two

[142] Interview with GEN(R) Robert W. RisCassi, interview by Ryan Kendall, June 3, 2021.
[143] Matt Schudel, "Edward C. Meyer, General Who Revamped Post-Vietnam 'Hollow Army,' Dies at 91," *Washington Post*, October 13, 2020, sec. Obituaries, https://www.washingtonpost.com/local/obituaries/edward-c-meyer-general-who-revamped-post-vietnam-hollow-army-dies-at-91/2020/10/13/141fbc48-0436-11eb-a2db-417cddf4816a_story.html.

ideas that shaped his priorities for the Army. First, Central Europe would remain the strategic priority, but the US would need a balance of heavy and light forces to support contingencies outside Europe. Second, the standard development process was insufficient to match the rate of change within the strategic environment. Thus, a different approach was required to overcome the lethargy Meyer associated with the defense acquisition and concept development process. For Meyer, the first idea shaped his theory of victory, while the second idea shaped how he operationalized his theory and implemented it within the Army.

***Meyer's Three Days of War***

In February 1980, General Meyer published a White Paper detailing his vision for the Army of the 1980s. Meyer later remarked that the purpose of the White Paper was to change the direction of the Army: "I felt it was necessary to develop a white paper outlining our responsibilities. Yes, we had a responsibility to Central Europe, but as you looked to the future there were going to be requirements all around the rest of the world."[144] Meyer defined these strategic requirements using a framework he termed the Three Days of War: "to deter the day before war; to fight the day of war; and to terminate conflict in such a manner that on the day after war, the United States and its allies enjoy an acceptable level of security."[145] Although the NATO alliance would remain the centerpiece of US foreign policy, Meyer saw the Three Days of War applying to various potential contingencies across the globe. The increased probability of conflict outside of Europe presented what Meyer termed "the most demanding challenge." The US had to develop and demonstrate the

[144] GEN(R) Edward C. Meyer, Senior Officers Oral History Program Project, interview by COL Keith Nightingale, 1988, Edward C. Meyer Papers, Senior Officers Oral History Program Project, Box 1, U.S. Army Heritage and Education Center, 455.
[145] GEN(R) Edward C. Meyer, *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983* (Washington, D.C.: Department of the Army, 1983), 52.

capability "to successfully meet threats to vital US interests outside of Europe, without compromising the decisive theater in Central Europe."[146]

To meet this strategic challenge, Meyer argued the Army would need to tailor its force packages to "meet the threat, accommodate the terrain, and avoid piecemeal commitment of inadequate forces."[147] While Meyer outlined the instances where the Army would need light, medium, and heavy force packages, he emphasized that most potential adversaries would seek quick, sharp victories due to their limited logistical capabilities. Thus, any force deployed to address this threat would require a significant anti-armor capability while also needing the flexibility to arrive before it was too late. Meyer proposed a new theory of victory: a light infantry division equipped with advanced technologies that could fight like a heavy division to meet this need.[148]

Meyer's articulation of the strategic challenge facing the US was in line with similar thoughts from senior national security officials within the Carter administration, such as National Security Advisor Zbigniew Brzezinski, who argued for a military force capable of responding to contingencies outside Europe.[149] However, Meyer's ideas for a balanced force containing strategically flexible light forces did not match the existing momentum within the policy subsystem. Secretary of Defense Harold Brown prioritized budgetary programs to restore US and NATO conventional capabilities, particularly anti-armor and mechanized forces.[150] As Meyer stated years after his tenure, "up until that time, we had been directed by

---

[146] Ibid., 52.
[147] Ibid., 54.
[148] Ibid., 54.
[149] PD/NSC-18 outlines the requirement for the Department of Defense to a deployment force with strategic mobility capable of operating independent of logistical bases in the Middle East, Persian Gulf, or Korea. Keefer's analysis links this insert to Brzezinski. See Jimmy Carter, "Presidential Directive/NSC-18 Subj: U.S. National Strategy," August 24, 1977, Jimmy Carter Presidential Library and Museum, https://www.jimmycarterlibrary.gov/assets/documents/directives/pd18.pdf and Keefer, *Harold Brown,* 342.
[150] Keefer provides an account of Brown's extensive efforts to restore NATO's conventional capabilities in Keefer, *Harold Brown,* 417-448.

OSD to focus the Army solely on Central Europe."[151] Meyer's White Paper articulated an alternate course for the Army.

***An Alternate Course***

Meyer's theory of victory was his answer to the emerging strategic demands. Meyer argued with Secretary Brown for the latitude not to mechanize the 9th ID but instead infuse it with the latest technologies to retain its strategic flexibility while increasing its lethality. Referring to Secretary Brown's desire to mechanize all but one active Army division, Meyer later recalled, "I had to have some means of throwing an obstacle in front of that steamroller."[152] Meyer felt experimenting with light infantry and emerging technologies would slow the momentum within the defense policy subsystem and enable the Army to prepare itself for the changes in the security environment.

Despite the impact of the external events of 1979, archival documents indicate Brown was not convinced that keeping 9th ID as a light division was the right approach.[153] In contrast, Meyer saw the events of 1979, specifically the Soviet Union's invasion of Afghanistan, as further evidence for his argument. During Congressional testimony in February 1980, Meyer emphasized that Europe remained the priority, but that recent events solidified the need for "the other Army- the Army that has to be able to be projected rapidly to counter threats in other parts of the world. I would like to see more dollars applied to technological options…that would permit us to have a more capable force that can be more

---

[151] Meyer, Senior Officers Oral History Program Project, 455.

[152] Meyer, Senior Officers Oral History Program Project, 270.

[153] Colonel Moellering, General Meyer's Executive Officer, informed Meyer that Secretary Brown would favor mechanization of the 9th ID in the draft Consolidated Guidance, John H. Moellering, "Correspondence to Gen Meyer, CSA From Col Moellering, XO To CSA," January 4, 1980, General Edward C. Meyer, Outgoing Backchannel A-M, Box 6, Folder 3, U.S. Army Heritage and Education Center.

rapidly deployed because of its lighter weight."[154] While Meyer did not mention the 9th ID specifically, his comments reflect similar ideas. After several months of discussion, on March 19, 1980, Brown agreed with General Meyer not to mechanize the 9th ID and to allow the Army to pair it with a High Technology Test Bed, with the intent to build a High Technology Light Division (HTLD).[155]

***Top-down and bottom-up***

Meyer envisioned the HTLD evolving similarly to his experiences with the 11th Air Assault Division experimentation efforts and his experience developing concepts as the 3rd ID Commanding General in Europe.[156] Meyer believed that "the people who are best qualified to develop tactics and doctrine are the people who are out there working in that area on a day to day basis."[157] Meyer felt the leaders in the field were best positioned to produce a light division that fought like a heavy division. The larger Army moved too slowly and was not as effective at innovation as the commanders in the field. For innovation to happen, it had to be decentralized away from organizations like TRADOC. From Meyer's perspective, as one aide pointed out, "there was no way to be innovative unless you could bypass the bureaucracy."[158]

---

[154] Edward C. Meyer, "Opening Remarks to the Committee, Hearing Before the Senate Armed Services Committee on the FY 81 DOD Appropriation: Army Programs, 26 February 1980," in *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983* (Washington, D.C.: Department of the Army, 1983), 66.
[155] John W. Vessey, "MT from VCSA, GEN Vessey to CSA, GEN Meyer," March 19, 1980, U.S. Army Heritage and Education Center.
[156] Meyer references the 11th Air Assault experience multiple times during his oral history and his collected works. He refers to the 11th and his time as Commanding General of the 3rd ID in Europe during his oral history. In each instance, he uses these examples to emphasize decentralization of innovation efforts. See GEN(R) Edward C. Meyer, Senior Officers Oral History Program Project, interview by COL Keith Nightingale, 1988, Edward C. Meyer Papers, Senior Officers Oral History Program Project, Box 1, U.S. Army Heritage and Education Center, 328-329.
[157] GEN(R) Edward C. Meyer, Senior Officers Oral History Program Project, interview by COL Keith Nightingale, 1988, Edward C. Meyer Papers, Senior Officers Oral History Program Project, Box 1, U.S. Army Heritage and Education Center, 459-460.
[158] Interview with LTG(R) John H. Moellering, interview by Ryan Kendall, Phone, October 13, 2021.

In Meyer's view, the key to innovation was the connection between his official sanctioning of experimentation and a unit in the field tasked with designing new concepts and organizations. This connection was critical to overcoming the bureaucratic challenges inherent in the defense policy subsystem:

> The important thing is that you turn an individual loose out in the field with the support of the senior leadership of the Army to test the concept, an idea, or something else. Everybody else in the Army knows that it is being tested and is there to support it … but it needs, again, to come from the top and be supported from the top.[159]

His sponsorship would combine with the experimentation of the 9th ID to prod organizations such as TRADOC and DARCOM from below, allowing the Army to "short circuit" existing systems.[160]

**B.3 Core Advocacy network**

General Meyer used the months immediately following Secretary Brown's approval of his plan to experiment with the 9th ID to form a core advocacy network. Meyer met with other Army senior leaders, such as the FORSCOM and TRADOC commanders, in June 1980 to outline the purpose and objectives of the High Technology Test Bed (HTTB) and the 9th ID. This meeting built on several months of work to outline the relationships and responsibilities of those involved in the 9th ID effort. These initial efforts created a core advocacy network internal to the Army, including the 9th ID, the soon-to-be-formed HTTB, and Army institutions such as HQDA, TRADOC, FORSCOM, and DARCOM. On June 19, 1980, General Meyer called the 9th ID Commanding General, Major General Howie

---

[159] GEN(R) Edward C. Meyer, Senior Officer Oral History Program Project, interview by COL Keith Nightingale, 1988, Edward C. Meyer Papers, Senior Officers Oral History Program Project, Box 1, U.S. Army Heritage and Education Center, 306-307.

[160] GEN(R) Edward C. Meyer, Senior Officer Oral History Program Project, interview by COL Keith Nightingale, 1988, Edward C. Meyer Papers, Senior Officers Oral History Program Project, Box 1, U.S. Army Heritage and Education Center, 328.

Stone, to inform him his division would pair with the HTTB at Fort Lewis, Washington, to develop the Army's new light division.[161]

External to the Army, Meyer's core advocacy network included the Secretary of Defense and Department of Defense civilian leaders. Meyer successfully convinced Brown of the need for the HTTB initiative. Evidence suggests he also convinced Robert Komer, Undersecretary of Defense for Policy, and Russell Murray, Assistant Secretary of Defense for Program Analysis and Evaluation, given that they helped communicate Meyer's argument to Secretary Brown.[162]

While these internal and external entities provide an initial snapshot of the core advocacy network, how long its associated actors supported Meyer's theory of victory remains in question. During the early stages of the experimentation process, there is evidence of opposition from TRADOC and FORSCOM commanders and their headquarters (see the following subsection). However, any opposition may have been compliant initially due to Meyer's positional authority. For those external to the Army, like Secretary Brown, Meyer's initiative was a low-risk proposition. There is no indication of immediate advocacy efforts outside of the initial decision to support the initiative. Therefore, it is likely that the strength of the core advocacy group was less than official appearances would indicate, or possibly that any support was fragile in the early stages.

---

[161] While there is no specific archival record of the phone call between Stone and Meyer, two different historiographies indicate it occurred on June 19, 1980. Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 1; Army Development and Employment Agency, "ADEA History: Part One The ADEA Story," September 1988, U.S. Army Heritage and Education Center, 3.

[162] Moellering mentions that Komer and Murray presented Meyer's ideas for the HTTB and 9th ID to Harold Brown in Moellering, "Correspondence to Gen Meyer, CSA From Col Moellering, XO To CSA."

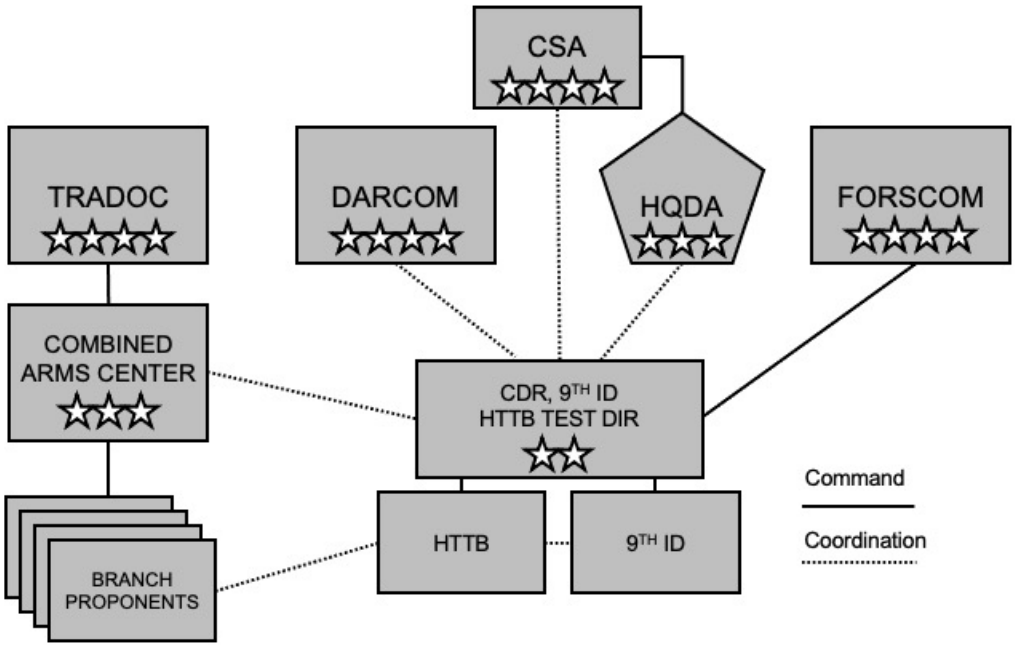
## C. CHARACTERISTICS OF EXPERIMENTATION

### C.1 Early Formation of the High Technology Light Division (1980-1981)

The 9th ID's and HTTB's early experimentation efforts faced significant challenges. The HTTB was a disruptive organization to the existing communities in the Army. Its establishment created friction with external organizations, such as TRADOC, and sparked credibility challenges from the testing and acquisition community. In addition, the early phases of 9th ID's experimentation process relied heavily on Meyer's sponsorship to overcome the antibodies within the Army and extend its core network. These obstacles restrained 9th ID's ability to build the momentum required to meet Meyer's timeline for a prototype division.

***Formalizing the HTTB***

Figure 2.2: Command and Coordination relationships of the 9th ID and HTTB



After Meyer established the HTTB, the major headquarters involved in the Army's traditional modernization process increased efforts to formalize command relationships and responsibilities. Although Fort Lewis did not have a testbed at the time, similar entities existed in the Army. For example, the TRADOC Combined Arms Test Activity (TCATA) at Fort Hood, Texas, tested and evaluated weapon systems for the 1st Cavalry Division and served as a model for the HTTB's structure. However, the unique nature of the combined 9th ID and HTTB initiative placed it and its commander at the intersection of the Army's three major headquarters: TRADOC, FORSCOM, and DARCOM. Consequently, they required a collective agreement to define each organization's associated relationships and responsibilities. An October 1980 Memorandum of Understanding (MOU) established both the internal and external structure of the HTTB (see Figure 2.2).[163]

The MOU was notable for four reasons. First, while the HTTB would conduct experiments, TRADOC retained significant control over what experiments the HTTB conducted and when. For example, TRADOC was responsible for approving the experimentation schedule. Also, TRADOC, in conjunction with FORSCOM and DARCOM, would approve of any concepts before their incorporation into the 9th ID. Second, it designated the 9th ID Commanding General as both the HTTB Test Director and Division Commander, giving him "the latitude to test equipment and doctrine that is not included in the outline test plan and to follow up on ideas developed during testing."[164] This

---

[163] The DARCOM commander signed the final MOU in October 1980. A draft version which did lacked only his signature was created in August 1980 and was the only archival document available at the time of this research. Huddleston confirmed the final date of the MOU in his historiography of the HTTB. See "Memorandum of Understanding Between the US Army Forces Command, the US Army Materiel Development and Readiness Command and the US Army Training and Doctrine Command, SUBJECT: The 9th Infantry Division High Technology Test Bed," August 25, 1980, Infantry - 9th Infantry Division Papers, 1980-1988; Box 1a, Folder 3, U.S. Army Heritage and Education Center; Huddleston, *High Technology Test Bed and the High Technology Light Division,* 12.

[164] "Memorandum of Understanding Between the US Army Forces Command, the US Army Materiel Development and Readiness Command and the US Army Training and Doctrine Command, SUBJECT: The 9th Infantry Division High Technology Test Bed."

authority enabled the 9th ID commander to experiment with new ideas outside the TRADOC approval process. Third, the MOU established two critical positions, the Deputy Test Director provided by TRADOC and the Deputy Test Director for Materiel Support, provided by DARCOM. While these individuals would work directly for the HTTB Test Director, their evaluation chain would include a senior officer in their parent organization. Finally, while the Test Director would write reports encapsulating experimental results, TRADOC would evaluate them, publish their assessment, and make recommendations to HQDA. This arrangement strengthened their control over information coming out of the HTTB and presented potential challenges to the Test Director's efforts to build an advocacy network.[165]

The HTTB relationship with TRADOC continued to be problematic even after the MOU. In the year before Meyer's HTTB decision, TRADOC continued its previous Division 86 analytical work, focusing on light divisions. General Meyer approved General Starry's study plan, known as Infantry Division 86 (ID86), in October 1979, agreeing that the light division must be able to reinforce NATO forces in Central Europe and respond to worldwide contingencies. While TRADOC owned the study, General Starry invited both FORSCOM and DARCOM to collaborate on the project, effectively enlarging the Division 86 community.[166] As with Division 86, TRADOC planners used the Battlefield Development Plan framework to guide their analysis. TRADOC's organizational bias towards the mental models of its Division 86 study shaped planners' efforts. A senior TRADOC commander stated that "planning had suffered from the lingering influence of the

---

[165] "Memorandum of Understanding Between the US Army Forces Command, the US Army Materiel Development and Readiness Command and the US Army Training and Doctrine Command, SUBJECT: The 9th Infantry Division High Technology Test Bed."

[166] John L. Romjue, *A History of Army 86, Division 86: The Development of the Light Division, the Corps, and Echelon Above Corps, November 1979-December 1980*, vol. II, II vols., TRADOC Historical Monograph Series (Ft. Monroe, VA: Historical Office, HQ TRADOC, 1982), 31.

heavy division."[167] TRADOC planners would present the results of their analysis to General Meyer over the year, finally gaining his approval in September 1980. However, while Meyer approved the design, he did not approve it for programming, instead opting to have the HTTB experiment with some of the ID86 components.[168]

ID86 had significant implications for initial HTTB efforts. A message from General Meyer to all Army commands in July 1980 linked ID86 with the HTTB: "Given the standard infantry division as a base, and employing the emerging results of the Light Division 86 study effort as a guide, the activities associated with the High Technology Test Bed will be directed toward developing a light division."[169] It became clear that TRADOC and the HTTB took this guidance to mean two different things. From TRADOC's perspective, their analytical product, ID86, was the blueprint for the future light infantry division and therefore the focal point for all experimentation. From General Stone's perspective, he believed General Meyer wanted the HTTB to incorporate its ideas into a new light division design. This difference in philosophy would prove significant for the first year of the HTTB.

These different philosophies caused the TRADOC and the HTTB to design experiments based on different assumptions. For example, General Stone, in a letter outlining the creation of HTTB committees to analyze concepts, stated, "The Chief of Staff of the US Army expects that many of the operational and organizational concepts to be evaluated as part of the High Technology Test Bed Program will *emanate directly from the 9th*

---

[167] General Richardson, Commander of the Combined Arms Center, quoted in Romjue, *A History of Army 86, Division 86: The Development of the Light Division, the Corps, and Echelon Above Corps*, *November 1979-December 1980*, 33.
[168] Ibid., 55.
[169] Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 9.

*Infantry Division*."[170] In contrast, General Richardson, the Commander of the Combined Arms Command, in a message to the TRADOC commander, stated:

> We need to push the planning effort for the 9th ID HTTB to ensure that the overall plan fully incorporates near-term enhancements, and the field testing of ID86 concepts and organizational designs, and eventual conversion of the 9th ID to ID 86 organization.[171]

These differing perspectives exacerbated structural divisions in the HTTB, causing HTTB personnel to work against one another. The MOU formalizing the HTTB created a Deputy Test Director position, initially filled by a TRADOC officer handpicked by Generals Starry and Richardson, Colonel Hal Van Meter. Van Meter shared the perspective of his parent headquarters, "[Infantry] Division 86 was clearly the structure from which we were to launch the test…That was the clear mission as I understood it, and let me say up front that this was not the mission as was perceived in the eyes of the 9th ID."[172] As much as Van Meter viewed the 9th ID as being counterproductive to his interpretation of the organization's mission, 9th ID staff elements would say the same about him. They viewed him as a "creature of [the Combined Arms Center] …an advocate of ID86."[173]

Major General Stone's first In-progress Review (IPR) with General Meyer in April 1981 helped clarify his original guidance. First, General Stone's perspective was correct. Meyer told Stone he was "not obliged to do anything with regard to ID86 as a start point if it does not make sense."[174] Meyer stressed to the TRADOC, FORSCOM, and DARCOM

---

[170] Howard F. Stone, "Memorandum From Major General Howard F. Stone To Undetermined Regarding High Technology Test Bed With Attachment," September 3, 1980, 9th Infantry Division Papers; Box 1a, Folder 4, 1980-81 General Sources, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/270662/20183030MN001419.pdf.

[171] Richardson quoted in Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 52.

[172] Van Meter quoted in Ibid., 53.

[173] Ibid., 136.

[174] Romie L. Brownlee, "Memorandum from Colonel Romie L. Brownlee to Undetermined Re: 9th Infantry Division High Technology Test Bed in Process Review," June 16, 1981, U.S. Army Heritage and Education Center.

commanders that Stone, as the Test Director, was the "primary player; he must have money to apply, and freedom to innovate."[175] Second, Meyer wanted more work done on organizational and operational concepts, and he wanted everyone to expedite the process. One report noted, "the CSA is highly frustrated by the structure and lack of speed with this project."[176] This clarified guidance was significant because it moved the HTTB and 9th ID beyond injecting technology into an existing construct. Meyer wanted new concepts to address the strategic challenge of contingencies outside of Europe.

Although the organizations had all signed an MOU, the resistance from TRADOC, FORSCOM, and DARCOM required that Meyer remain consistently involved. In response, Meyer requested personal updates every four months from Stone, providing him an exclusive line to the CSA and circumventing the commanders of DARCOM, TRADOC, and FORSCOM. Reflecting on what he expected from the 9th ID in a 1984 interview, Meyer stated, "My own view at that time was that the more it was their idea, their baby, that the more enthusiasm and interest would evolve. If it became a case in which everything were directed downward, you would end up stifling their initiative."[177]

In addition to tensions with TRADOC, DARCOM, and FORSCOM, the 9th ID's early experimentation caused significant instability with the Testing and development community. The ad hoc nature with which the HTTB purchased equipment and then conducted experiments resulted in warnings from the outside agencies concerning the ability to use any data collected for future procurement efforts. This instability continued under Stone's successor, Major General Elton. A senior officer who served as the HTTB Chief of

---

175 Ibid.

176 Joseph H. Felter Jr., "Memorandum from Colonel Joseph H. Felter, Jr. to Undetermined Re: CSA Interim Problem Report," April 7, 1981, Infantry - 9th Infantry Division Papers, Box 1b, U.S. Army Heritage and Education Center.

177 Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 43.

Staff recalled "the ORSA community was very critical of the outcomes of tests because they were so loosely organized," pointing out that senior Army operations research officials viewed the experiments as merely surveys of participants rather than the rigorous standards required to justify appropriations with Congress.[178] Challenges to the credibility of the HTTB's experiments were yet another obstacle to building momentum for change.

**C.2 Efforts to expand the network (1980-1981)**

Even with the HTTB's initial challenges, General Meyer was able to use the HTTB's nascent experimentation process to grow the advocacy network. Early on, Meyer effectively used external groups, trusted individuals, sister services, Allies, and the media to help build consensus around his idea and garner the necessary support. For example, Meyer requested an Army Science Board Summer Study in 1980 to determine if the 9th ID's combat effectiveness increased if equipped with existing or emerging technologies.[179] Military, government civilian, industry, and academic leaders comprised the Army Science Board, a federal advisory panel that advised Army leadership on scientific research and development issues.[180] For example, a senior Army officer and a senior Texas Instruments member co-chaired the 1980 summer study.[181] The Board was a well-respected advisory group within the defense policy subsystem and helped expand the advocacy network beyond traditional organizations while strengthening consensus amongst senior defense officials.

---

178 Interview with COL(R) Larry Dacunto, interview by Ryan Kendall, April 19, 2021.

179 Meyer requested the Army Science Board conduct a Summer Study specific to the High Technology Light Division concept. See Percy A. Pierre, "Correspondence from Lieutenant General M. Collier Ross to Percy A. Pierre Regarding Brief-Out Session with Attachments," June 30, 1980, Robert M. Shoemaker Papers; Box 8a, Folder 11, Invitation Files- Regrets Only, [Part 4 Of 4], July-September 1980, U.S. Army Heritage and Education Center, and Army Development and Employment Agency, "ADEA History: Part One The ADEA Story," September 1988, U.S. Army Heritage and Education Center, 3.

180 LTC Scott S Haraburda, "Army Science Board — Providing a Half Century of Scientific Advice and Guidance," *Army AL&T*, March 2006, 70–73.

181 Christman, "Message Traffic from Mr. Christman To Various Regarding Army Science Board Summer Study of the High Technology Light Division," May 20, 1980, Donn A. Starry Collection; Box 50a, Folder 4a; Message Files - May 1980 [Part 2aof 3], U.S. Army Heritage and Education Center.

The results of the summer study were not only supportive of Meyer's HTTB decision, they were also timely. Meyer had requested the short-notice summer study through Dr. Percy Pierre, the Assistant Secretary of the Army for Research, Development, and Acquisition.[182] The Board presented their results to senior leaders from across the Army at both Fort Lewis and the Pentagon in July 1980, shortly after Meyer decided to create the HTTB. The Board's findings supported Meyer's approach and recommended structural changes, which informed the MOU between TRADOC, DARCOM, and FORSCOM. The extent to which the Board's efforts galvanized consensus for the HTTB and a high technology light division beyond the MOU is unclear. However, the summer study provided a degree of legitimacy to Meyer's efforts within the defense policy subsystem.

Meyer sent trusted individuals, including current and retired senior officers and defense officials, to observe the HTTB. First, the Vice Chief of Staff of the Army, General John Vessey, visited in late October 1980. Outside of Vessey's positional legitimation, he supported Meyer's efforts by giving the 9th ID and HTTB leadership key insights into what Meyer expected. Second, Dr. Eugene Fubini, Vice Chairman of the Defense Science Board, visited Fort Lewis at the request of General Meyer.[183] Fubini described his visit as having three objectives: provide General Meyer with a progress report, help tell the HTTB and Light Division story at the Department of Defense level, and advocate for the involvement of the Defense Science Board.[184] Fubini helped build connections to entities that otherwise

---

[182] Christman apologizes to the TRADOC senior leadership in his message notifying them of the summer study, noting that usually the Army Secretariat Christman, "Message Traffic from Mr. Christman to Various Regarding Army Science Board Summer Study of the High Technology Light Division."

[183] General Meyer later referred to Dr. Fubini as "…one of the most influential gurus in Washington." Quoted in Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 112.

[184] Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 113.

would not receive information regarding the HTTB, ensuring the information they did receive was favorable to building consensus.

Allies played a significant role in early efforts to increase the advocacy network. By mid-1981, over 20 countries, including 15 from NATO, received invitations to participate in the HTTB. In July 1981, New Zealand was the first to send a representative, with other countries following suit shortly thereafter. In addition to liaison officers, allied partners visited the HTTB, receiving unclassified presentations and observing different technologies.[185] These efforts helped diffuse Meyer's theory of victory into a broader defense policy network while opening new information pathways from which the HTTB could draw ideas and gain access to foreign defense industries.

Meyer also recognized the need to integrate the other services. This integration was necessary to facilitate interoperability and increase awareness of complementary efforts. For example, early coordination with the Air Force mobility detachment at McChord Air Force Base helped confirm assumptions regarding airlift capacities and dimensions. At the same time, a visit to Boeing with Air Force leaders exposed the HTTB to emerging Air Force technologies.[186] Since budgetary constraints remained a challenge during the early HTTB period, opportunities to socialize ideas with sister services offered the potential to combine interests rather than threatening sister services' programs.

Finally, news media coverage of the HTTB helped communicate Meyer's initiative to an audience beyond traditional defense policy. For example, a March 1981 *New York Times* article highlighted the Army's integration of new and advanced technologies, emphasizing

---

[185] Huddleston offers the most complete overview of allied participation in the HTTB in his chapter on allied involvement in Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 116-125.

[186] Howard F. Stone, "MT from Commander of 9th Infantry Division to Various Re: 9th Infantry Division High Technology Test Bed Discretionary Funds," December 15, 1980, Infantry - 9th Infantry Division Papers, 1980-1988; Box 1a, Folder 3, U.S. Army Heritage and Education Center.

the roles of both junior soldiers and industry in developing innovative ideas to thwart assessed Soviet advantages.[187] Articles such as these brokered the Army's ideas with external audiences such as the American public, which the Army relied on for recruitment and support, and the burgeoning industries, such as electronics, which otherwise would not consider the Army a potential customer.

As Stone prepared to change command in July 1981, he held his final IPR with General Meyer. Despite the internal turmoil and challenges associated with the first year, some progress was made. The HTTB and 9th ID experimentation Fiscal Year (FY) 1981 plan included more than eleven candidates, consisting of equipment, organizations, and management concepts. The division began to test and field a new aviation organization, the Air Cavalry Attack Brigade (ACAB), a significant advancement for incorporating rotary-wing aviation in an infantry division. New local initiatives, such as the placement of Apple computers in command posts, helped those involved explore ways to integrate advanced technologies.[188] Additionally, relationships between those conducting the experiments and the associated institutional proponent became formalized, helping to expedite small-scale experimentation efforts, including the first field exercise supporting experimentation, Celtic Echo, in May 1981.[189]

Due to Meyer's significant personal involvement, the HTTB established connections with policy influencing organizations, groups, and actors such as Dr. Fubini, the Army Science Board, the Air Force, and Allies. While he helped spread the HTTB's influence

---

[187] Drew Middleton, "U.S. Unit Is Relying On Sleek New Arms: Soviet Has Edge In Big Weapons, But Rapid Deployment Force Has Technological Aces A High-Technology Test Bed Helicopters With Flexibility To Balance Advantage In Numbers Nuclear, Biological And Chemical," *New York Times)*, March 23, 1981.
[188] "TRADOC Annual Command History (1980-1981)," n.d., TRADOC Military History and Heritage Office, 103.
[189] Early experimentation efforts are summarized in both Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT* and "Motorized Experience of the 9th Infantry Division 1980-1989" (Fort Lewis, WA: Department of the Army, June 9, 1989), https://apps.dtic.mil/dtic/tr/fulltext/u2/a370233.pdf.

throughout the US defense policy subsystem, it did not solve the instability with TRADOC, FORSCOM, DARCOM, and the testing community. Major General Stone's task beginning in June 1980 was significant, and much of his success relied on outside support. Meyer's senior sponsorship proved enough to get the initiative off the ground, but Stone's successor would face an even more significant challenge to meet Meyer's aggressive timeline.

### C.3 From HTTB to HTLD: Building an identity (1981-1983)

> He [Meyer] has trusted us with the greatest empowering experience in a lifetime. It will never come again in this huge bureaucracy where the CSA will take something out of FORSCOM and TRADOC and give it to a division.[190] – MG Robert Elton

From July 1981 to April 1982, Major General Elton, with the sponsorship of General Meyer, attempted to turn the Army's traditional combat development process on its head, placing the 9th ID and HTTB in the lead with TRADOC, DARCOM, and FORSCOM in supporting roles. Elton's successfully used the concept development and experimentation process to forge a unifying purpose for the HTTB and 9th ID while establishing new metrics required for continued experimentation. However, challenges from FORSCOM's readiness requirement and resistance from TRADOC and HQDA planners remained and continued to restrain 9th ID's efforts to generate external support. Additionally, the 9th ID's innovative organizational designs and reliance on surrogate equipment created difficulties translating the HTLD design into something the bureaucracy understood. As the HTLD prepared for larger-scale experiments, Meyer's sponsorship would continue to be critical to help the HTLD overcome these challenges.

[190] Report Regarding Oral History for Robert Elton, interview by Lieutenant Colonel Joseph W. Trez, Robert Elton Papers; Box 2, Oral History, U.S. Army Heritage and Education Center, 184-185.

***Developing the Concept and Building Internal Consensus***

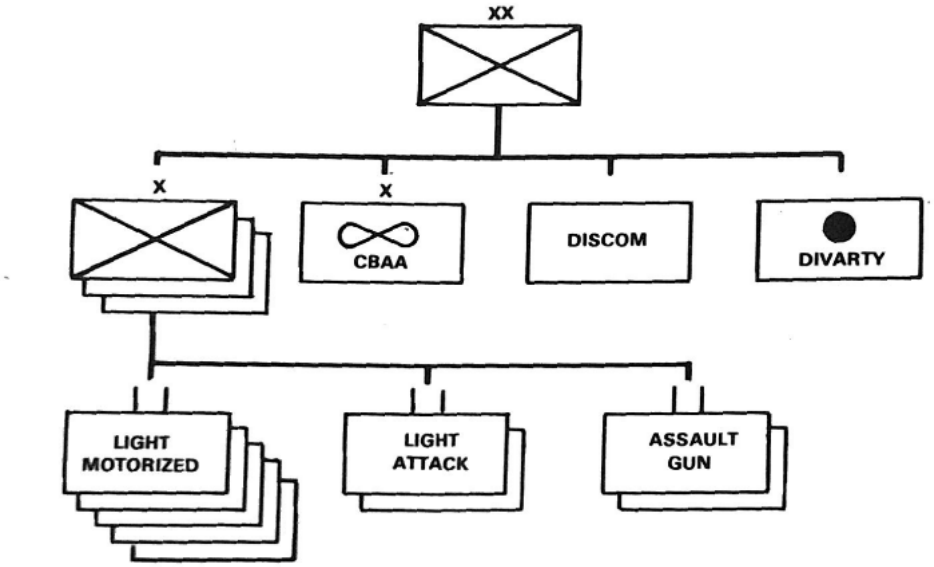
General Meyer handpicked Major General Robert Elton to replace Stone as the 9th ID Commanding General and HTTB Test Director in August 1981.[191] During his tenure, Elton shifted the 9th ID's and HTTB's focus from sporadic experimentation to concept development and iterative experimentation. When Elton took command, experimentation had begun to take hold, but the lack of an operational concept left the organizations without an intellectual direction. Elton later reflected on the situation: "The major deficiency in the division was that they were working to just do something with what they had. They had no mission. They had no concept of operations."[192] Meyer personally selected Elton, so Elton felt a connection with Meyer that Stone did not. He understood not only what Meyer wanted but how he wanted it done. Meyer's guidance was broad, but it empowered Elton to jumpstart the experimentation process and, more importantly, build an identity around it.[193]

Elton built a shared identity within the 9th ID and HTTB using the concept development and experimentation process. Elton put Meyer's theory of victory into practice, designing a light division that fought like a heavy division through the infusion of technology. Elton began a "How to Fight" initiative, utilizing brainstorming sessions and map board exercises where HTTB and 9th ID leaders fought against one another in a Southwest Asia scenario, employing draft concepts and integrating Air Land Battle principles. These sessions had two primary conclusions. First, the ID86 construct was insufficient for the type of mission that Elton and his team envisioned. Second, concepts surrounding deep strikes into an enemy's rear echelons, which valued speed and lethality

[191] Meyer referred to Elton as an "innovator" and someone who was good at thinking through problems. Just as Meyer had brought Elton in because of his talents, Elton would do the same with talented officers, Meyer, Senior Officer Oral History Program Project, 298.
[192] Report Regarding Oral History for Robert Elton, 183.
[193] Ibid., 184-185.

over armored protection, became one of the central ideas behind the High Technology Light Division (HTLD) concept, which Elton approved in August 1981.[194]

Figure 2.3: HTLD Organizational design April 1982[195]




**NOTE: Other combat support assets include ADA battalion, engineer battalion, signal battalion, military intelligence battalion, NBC company, and military police company.**

In the winter of 1982, Elton utilized a series of concept development workgroups to codify new ideas, build consensus within the division leadership, and extend the advocacy network. Elton brought these external groups into the process, enabling branch proponents, such as infantry and logistics and Combined Arms Center planners, to participate in the design of the HTLD. Bringing in these different entities into the process was especially important because of the specialized equipment in the HTLD design and the innovative ideas for their employment. The most controversial of these unit designs was the Light Attack Battalion (LAB) (see Figure 2.3). The LAB's mission was to conduct attacks deep in

[194] Summarized from Chapter 14 of Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT* and Report Regarding Oral History for Robert Elton, 185-187.
[195] High Technology Test Bed, "Operations Manual for Light Attack Battalion," April 1982, Infantry - 9th Infantry Division Papers, Box 5D, Folder 33, U.S. Army Heritage and Education Center, 1-3.

the enemy's rear area and flanks utilizing ground-launched precision weapons and Air Force fixed-wing support. It relied on the speed, mobility, and firepower of Fast Attack Vehicles (FAVs), militarized dune buggies, armed with anti-tank weapons and automatic grenade launchers.[196] Convincing the rest of the Army to accept the concepts and purchase the equipment would require support from all the major headquarters. Events like Elton's workshops attempted to build that support from the bottom up, although with limited success.

Even as Elton built momentum, tensions with outside organizations remained. Despite 9th ID's primary mission of concept development and experimentation, FORSCOM still required the 9th ID to maintain readiness and perform additional taskings, such as conducting summer training for officer candidates.[197] The Army did not have the luxury of not using an entire division's worth of force structure to support war plans and operational commitments. From Meyer's perspective, this healthy tension kept the Division engaged and focused on solving problems. However, in practice, it proved difficult. Elton understood that his division would have to do both and that failing to maintain readiness or execute assigned missions would only hamper FORSCOM support for experimentation. This tension shaped the 9th ID's relationship with the FORSCOM Commander, General Richard Cavazos, who told Elton, "I never want you to tell me about the Test Bed. When I come to visit, I want to talk about training and readiness."[198] For Cavazos, experimentation in a unit slated against war plans was against convention; it was uncomfortable and threatened readiness.

---

[196] Ibid., 1-4.

[197] High Technology Test Bed, "Operations Manual for Light Attack Battalion," April 1982, Infantry - 9th Infantry Division Papers, Box 5D, Folder 33, U.S. Army Heritage and Education Center.
left the mission with the 9th ID. Interview with LTG(R) William S. Carpenter, interview by Ryan Kendall, September 28, 2021.

[198] Report Regarding Oral History for Robert Elton, 205.

In addition to tensions with FORSCOM, the senior leaders of TRADOC and its subordinate Combined Arms Command continued to challenge the 9th ID. The HTTB and 9th ID offered opportunities for the branch proponents to operationalize their ideas, but the senior leaders did not welcome the loss of control. Elton reflected on this relationship during an interview after his command:

> We had every single community involved out of TRADOC, and of course, it really upset them at TRADOC Headquarters and CAC. The schools were not too upset because they were seeing us use their ideas, but it upset TRADOC Headquarters and CAC. They were the ones who were supposed to put it all together, and we were putting it together or trying to.[199]

While most branch proponents had been supportive, at least at the staff officer level, the military intelligence branch leadership initially was resistive. The 9th ID's Military Intelligence Battalion experimented with commercial equipment, such as commercial scanners and lightweight aircraft, foreign surveillance technologies, and created a separate detachment for long-range reconnaissance. The battalion used very little of the equipment or organizational design provided by the branch proponent. When the Military Intelligence (MI) Branch chief visited, the former battalion commander recalled that he "was very contentious, very unhappy, and left muttering to himself."[200] The 9th ID's concept and experimentation process was an implied criticism of the MI branch proponent's work. With these external tensions, Elton had to rely on his connection with General Meyer for support.

***The importance of Meyer's continued support***

With an In Progress Review with General Meyer scheduled for April 1982, Major General Elton conducted a pre-briefing of the HTLD design and concept to both the

[199] Report Regarding Oral History for Robert Elton, interview by Lieutenant Colonel Joseph W. Trez, Robert Elton Papers; Box 2, Oral History, U.S. Army Heritage and Education Center, accessed November 16, 2021, https://emu.usahec.org/alma/multimedia/902246/20182354MNBT1036357282F268628I001.pdf, 216.
[200] Interview with LTG(R) Patrick M. Hughes, interview by Ryan Kendall, October 21, 2021.

FORSCOM and TRADOC commanders. The FORSCOM briefing proved noncontroversial. In contrast, the TRADOC presentation met resistance from the TRADOC staff, many of whom rejected Elton's proposals. General Otis, the TRADOC commander, accepted his staff's comments but deferred to Elton, saying, "Well, let's let them take this new concept through."[201] General Otis' willingness to not interfere with Elton's progress but let him present the concept to Meyer mostly unfiltered represented a temporary breakthrough in the relationship between the senior TRADOC leaders and the HTTB.

Elton and his team briefed General Meyer in the Pentagon on April 29, 1982. In attendance were key leaders of the Department of Army Staff, TRADOC, DARCOM, and Department of Defense Program Analysis and Evaluation. In what he described as a "grandiose briefing," Elton presented the organizational concept and design, finishing with a series of recommendations to facilitate continued experimentation. Elton recalled Meyer's reaction as "magnificent": "We got done with this thing and Meyer said, 'Are there any questions?' A couple of people had questions, but clearly several of them thought we were nuts. Meyer said, 'Okay, well, that is the way we are going to do it.' They just about died."[202]

Meyer approved the provisional organization designs and associated surrogate equipment to support future experimentation activities, expecting to field a prototype High Technology Light Division in 1985.[203] Additionally, Meyer approved the HTLD's design parameters: 16,000 personnel and the ability to deploy the Division in no more than 1,000 C-141 flights.[204] Meyer's commitment, combined with the unorthodox approach of the HTTB,

---

[201] Report Regarding Oral History for Robert Elton, 230.
[202] Ibid., 190-191.
[203] Paul G. Cerjan, "Memorandum for Record, Subj: Chief of Staff Army Briefing, 29 April 1982," April 30, 1982, Infantry - 9th Infantry Division Papers, Box 1b, Folder 1, U.S. Army Heritage and Education Center.
[204] Elton chose these numbers because they placed the HTLD in between the Airborne and Air Assault division design requirements. They were not numbers created by General Meyer, but he did use them as benchmarks associated with strategic flexibility, "[Report of] Army Development and Employment Agency

was shocking for those in the room. Even Elton thought that Meyer might think he was crazy. Instead, Elton realized although Meyer didn't agree with all the ideas, Meyer felt it would shake itself out in the end. In a 1983 interview, a senior HTTB officer captured the moment's significance: "…that sent one tremendous shudder of signals throughout the United States Army…It is at that time they started to realize that the Chief is serious about this."[205] For Meyer, the process would get the Army what it needed if the users led it.[206]

Leading up to the April presentation, the 9th ID began transitioning portions of the division into the new organizational designs to support future experimentation. This process accelerated following Meyer's approval. The transitions were part of the iterative experimentation process. As the HTTB and 9th ID refined the concept, they adjusted the organizations and associated equipment for future experiments.

However, these transitions presented several challenges. First, the organizations did not look like anything in the Army; therefore, they did not translate into the Army's bureaucratic equipment, personnel, or evaluation processes. As one senior officer noted:

> We had a division where every piece of a standard division is plugged into something in the Army personnel system, the Army logistics system, and the Army maintenance system…when you unhook from that system, everything immediately starts to die. It's like turning off the irrigation system. And now you're trying to hand manage it.[207]

This "hand managing" required a significant amount of organizational energy from the 9th ID and HTTB, CAC, and HQDA staff to translate the design into something the bureaucracy understood.

---

Input," July 5, 1983, 9th Infantry Division Papers; Box 6b, Folder 19, U.S. Army Heritage and Education Center.

[205] Colonel Paul Cerjan quoted in Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 205.

[206] Report Regarding Oral History for Robert Elton, 190-191.

[207] Interview with GEN(R) Barry R. McCaffrey, interview by Ryan Kendall, May 17, 2021.

Elton understood that FY1983 would be the "year of decision" for the HTLD due to the momentum associated with the concept and design approval and the limited time remaining in General Meyer's tenure.[208] Personnel, equipment, and doctrine were all intertwined in how an outside agency would evaluate a provisional unit during experimentation. For example, how should a Light Attack Battalion operate? What assumptions must be made when an organization uses surrogate equipment in fewer numbers and fewer people than an established unit? HTTB and the 9th ID iterated with the associated TRADOC staff and proponent schools to establish criteria based on the organizational concepts. These initial efforts set conditions for continued experimentation.

Elton used the first large-scale experiment as a vehicle to further explore these questions and build consensus for both the Division's concepts and the associated evaluation criteria for future experiments. Exercise LASER MACE, conducted at Yakima Firing Center, was the first large-scale experiment with the HTLD design, involving approximately 20,000 personnel, including representation from the Air Force, Army Reserves, and National Guard. The exercise provided a force-on-force scenario to stress the HTLD concepts of the Light Motorized Infantry Battalion, the Assault Gun Battalion, and the Light Attack Battalion. The Division After Action Review emphasized how the exercises demonstrated the viability of the HTLD concepts, reflecting the continued internal consensus regarding the HTLD concepts.[209] In contrast, external organization representatives did not see the events in the same light, with two different officers noting the training deficiencies of the participating soldiers and the need for better instrumentation.[210]

---

[208] LTC John E. Barrington, "Memorandum from Headquarters, 9th Infantry Division to Distribution Re: Minutes of Transition Review Committee Meeting," August 12, 1982, 9th Infantry Division Papers; Box 6d, Folder 33, U.S. Army Heritage and Education Center.

[209] Barry McCaffrey, "LASER MACE FTX AAR," September 12, 1983, Infantry - 9th Infantry Division Papers, 1980-1988; Box 6a, Folder 1, U.S. Army Heritage and Education Center.

[210] Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 243.

The experiment also highlighted the challenges of surrogate equipment. Delays in equipment delivery times caused Meyer to set the transition to a fully functional HTLD for 1986 instead of his original goal of 1985. The HTLD's formal evaluation, initially scheduled for October 1983 at the National Training Center, also slipped to early 1985 at Fort Bliss, Texas, to allow more time for the Division to secure necessary equipment.

***Surrogate Equipment in the HTLD***

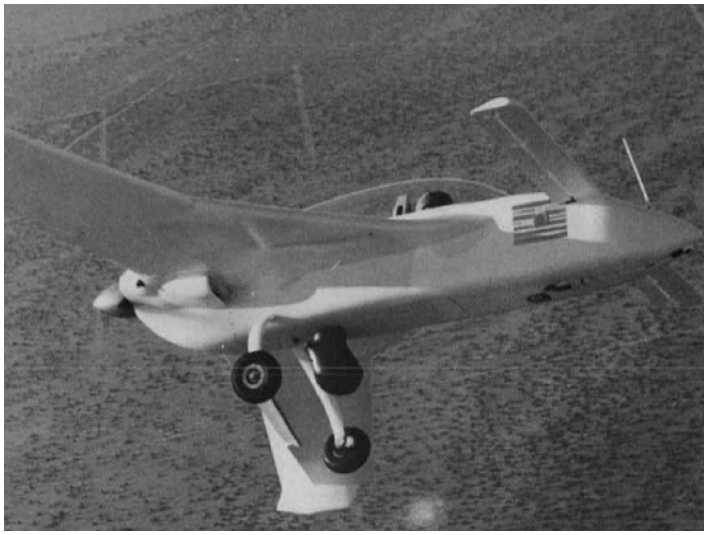
LASER MACE only brought some of the challenges with surrogate equipment to light. Surrogate equipment were items that the HTTB had either purchased or leased for experimentation. Since these were not the Army's inventory or part of an official acquisition program, the Army bureaucracy did not recognize them. Therefore, it was challenging to purchase them at sufficient scale to support experimentation.[211] Unlike the final objective equipment associated with a complete unit, surrogate equipment supported experimentation and training in various degraded forms. For example, Mercury Green was a manned surrogate aircraft with sensors (see Figure 2.4), used in place of a more advanced unmanned system that 9th ID expected to purchase in the future. In addition, the LAB included approximately 80 Fast Attack Vehicles leased from Chenoweth Racing Products to facilitate experimentation (see Figure 2.5). Each FAV required extensive modifications by the HTTB's Skunkworks, an on-site fabrication facility that modified equipment for testing and experimentation.[212] Similarly, Dodge pick-up trucks served as surrogate tactical troop carriers (see Figure 2.6), in place of what later became the High Mobility Multipurpose Wheeled

[211] Army organizational programming documentation, known as a Modified Table of Equipment, accounts for a standardized number of equipment and the personnel required to operate and maintain that equipment. For example, an aviation organization requires a certain number of refueling trucks which require a certain number of operators and mechanics to maintain them. The document integrates required people, equipment, and resources and standardizes them to facilitate actions such as personnel movements, equipment procurement, and logistics parts.

[212] 9th Infantry Division Public Affairs Office, "'Skunk Works' Aids in New Light Division Development," *Army Research, Development, and Acquisition Magazine*, February 1983.

Vehicle (HMMWV), and as surrogate firing platforms for the Ground Launched Hellfire missile.[213]

Figure 2.4: Mercury Green Surrogate Remote Piloted Vehicle[214]



[213] For a complete listing of surrogate equipment utilized during the 9th ID experiments, see Annex D, Equipment listing in "Motorized Experience of the 9th Infantry Division 1980-1989," 318-336.
[214] Major Robert Perceval, "9th Infantry Division (Motorized)-Ready Now!" *Military Intelligence* 11, no. 2 (June 1985), 20.

Figure 2.5: Fast Attack Vehicles with MK19s and Anti-tank missiles[215]

Figure 2.6: Surrogate squad carrier[216]

Surrogate equipment did not impact only live experiments. As the iterative concept development and experimentation process continued, the HTTB began to develop a

215 Ibid., 21.

216 9th Infantry Division Public Affairs Office, "'Skunk Works' Aids in New Light Division Development," *Army Research, Development, and Acquisition Magazine*, February 1983.

simulations capability. 9th ID leaders began to utilize simulations software to conduct experiments before going to the field, or on occasion, in a hybrid form. However, these simulations came with unique challenges. Just as the Army's processes did not include HTLD technologies, the simulation software did not have models for FAVs, motorized squad carriers with anti-tank weapons, or RPVs. This inability to replicate the technologies led to either overestimating capabilities or the unit going to great lengths to incorporate the capabilities in an artificial form. For example, to replicate the RPV capability for simulations, the manned version would fly and record portions of the Yakima training area, land, then provide a videotape to the simulation participants.[217]

Finally, the 9th ID's surrogate equipment created credibility issues with external audiences. Due to its unorthodox equipment, the 9th ID became known in the Army as the Toys R Us Division. The technologies became the narrative rather than the concept, which presented challenges for building consensus. Surrogate technologies also created a credibility gap with senior leaders outside Fort Lewis. As one former 9th ID senior leader pointed out, while soldiers may accept a concept built with primarily surrogate equipment, senior leaders would not. From his experience in the 9th ID, without seeing and understanding the concept for themselves, senior leaders tended to question the credibility of the experimentation process due to the assumptions associated with surrogate equipment.[218]

### C.4 Consolidating and Extending the Network

Meyer's efforts to extend and reinforce the advocacy network towards the end of his tenure had mixed results. He used the Defense Science Board to advocate for the HTLD's

[217] Two senior officers discussed the central role that simulations played and different instances where participants had to assume certain abilities because the equipment was either a surrogate or the objective system could not be represented in the simulation. Interview with LTG(R) Patrick M. Hughes and Interview with LTG(R) Paul E. Blackwell, interview by Ryan Kendall, May 6, 2021.
[218] Interview with LTG(R) Paul E. Blackwell.

experimentation process and created a new organization to embed experimentation deeper into the Army bureaucracy, setting conditions for his successor, General John A. Wickam. Although Meyer was successful initially, his attempts to strengthen the advocacy network exposed the continued resistance to the HTLD within the Army's leadership. Furthermore, while Elton became more aggressive in his attempts to extend the advocacy network to industry, Meyer and Elton struggled to communicate the HTLD's innovative ideas with the rest of the Army. As Meyer finished his time as the CSA, his hard-fought successes remained threatened by the limited support from key constituencies across the defense policy subsystem.

The Defense Science Board provided Meyer with a valuable mechanism to garner support for the HTLD and its experimentation process. In early 1981, Meyer requested the Defense Science Board study the application of high technology to ground operations. Dr. Fubini, who served as the chairman for this study, was a proponent of Meyer's and a key advocate of the HTLD. The Board's analysis was expansive, examining the implications of specific technologies, new concepts, the conduct of experiments, and how the Army had organized around the 9th ID and the HTTB. The board's findings supported Meyer's decision to create the HTTB and recognized it as an example for the other services. However, the findings highlighted that "necessary support for the HTTB from important people in OSD and the Congress is lacking- but would be strong if they were informed and knowledgeable about Army intent and objectives." Therefore, the Board recommended "that the Chief of Staff of the Army, as a matter of priority, act to improve the support base for the HTTB/HTLD in OSD and Congress."[219] The Board's findings were harbingers of future challenges for the HTLD.

[219] Eugene Fubini, "Defense Science Board Task Force on Application of High Technology for Ground Operations" (Washington, D.C.: Office of the Under Secretary of Defense, Research and Engineering, February 1983).

Additionally, General Meyer created a new organization to embed user-driven experimentation within the bureaucracy and ensure continued support from Department of Defense officials. In late 1982, General Meyer proposed establishing the Army Development and Employment Agency (ADEA) using the experience and structure of the HTTB as a model. Meyer advocated for funding flexibility and future support with the Under Secretary of Defense for Policy, Fred Iklé, and the Under Secretary of Defense Research and Engineering, Richard Delauer. Meyer again expressed the importance of placing the user at the forefront of concept development while noting that "the entire [ADEA] effort will continue to be a complicated and tough program to execute...very little about the effort has been business as usual."[220]

Despite Meyer's efforts, the TRADOC, FORSCOM, and DARCOM commanders' perspectives on ADEA reinforced previous evidence that each organization and its commander saw the 9th ID and the HTTB as a threat to their mission and beliefs regarding how the Army should change. For example, at a January 1983 IPR for Meyer, the TRADOC, FORSCOM, and DARCOM commanders voiced varying degrees of concern about ADEA's external relationships. FORSCOM argued against ADEA, seeing it as a duplication of existing organizations and missions, while TRADOC and DARCOM were most concerned with ADEA reporting to HQDA instead of one of the major headquarters.[221] Despite these disagreements and multiple proposals that would place ADEA within one of the existing organizations, General Meyer established ADEA as a Field Operating Agency of HQDA, removing any direct influence of TRADOC, FORSCOM, and DARCOM. As a result, the

---

[220] Edward C. Meyer, "Memorandum for Under Secretary of Defense for Policy SUBJ: Establishment of a Development and Employment Activity at Fort Lewis, Washington," November 19, 1982, 9th Infantry Division (Motorized) Papers; Box 2b, Folder 18, U.S. Army Heritage and Education Center.
[221] 9th Infantry Division, "HTTB/HTLD Briefings to CSA," January 7, 1983, Infantry - 9th Infantry Division Papers, Box 1a, Folder 7, U.S. Army Heritage and Education Center.

HTTB transitioned to ADEA before General Meyer's departure, with the organization's charter left for his successor to approve.[222]

Similar to Meyer, Elton sought ways to use experimentation to extend the advocacy network. As the Division searched for technologies to assist the HTLD, Elton took a more purposeful route to connect with industry. For example, the American Defense Preparedness Association held a two-day panel in December 1982 consisting of sixteen senior executives from numerous defense contractors who discussed many topics that were favorable to the HTTB's efforts. Also, the Association of the United States Army Industry Symposium, held in the vicinity of Fort Lewis, was put together at the request of General Elton. The event included more than 370 representatives from 83 corporations.[223] While it is unclear what, if any, contracts came out of these symposiums, Elton understood the need to connect with industry to gain support for the 9th ID's experimentation process. For example, the *HTLD Challenge to Industry* brochure was a twenty-page brochure that helped inform industry about the HTTB and the 9th ID and how companies could interact and offer their products for experimentation.[224]

Despite Meyer's efforts to garner support and remove obstacles that impeded the HTLD's development, he failed to take advantage of other opportunities to decrease the knowledge gap referenced in the DSB report. Although he was personally invested in the 9th ID, Meyer rarely made the 9th ID a significant part of his public comments. For example, Meyer only briefly mentioned the 9th ID in his keynote speeches at the annual AUSA conventions. Also, his articles in the AUSA's Green Book, a yearly publication that AUSA used to communicate the Army's interests, rarely explained the purpose of the HTLD, the

---

[222] Army Development and Employment Agency, "ADEA History: Part One The ADEA Story," 14.
[223] "Motorized Experience of the 9th Infantry Division 1980-1989," 22.
[224] High Technology Test Bed, "High Technology Test Bed Challenge to Industry," September 9, 1982, 9th Infantry Division (Motorized) Papers; Box 3a, Folder 4, U.S. Army Heritage and Education Center.

value of its experimentation process, or what it meant for the Army.[225] Meyer left it up to Elton, among others, to connect with industry during local events at Fort Lewis and through the HTTB instead of leveraging larger, more public forums such as the AUSA annual convention. Finally, while he was CSA, Meyer infrequently discussed the 9th ID in his Congressional testimonies.[226] Elton later reflected on the impact of the lack of a coherent messaging campaign during an oral history interview:

> I really screwed up at Fort Lewis and got people confused, and then they got upset because we didn't market it. I don't mean telling falsehoods. I mean just marketing what we were doing so that the doctrine, structure, and equipment are out there in a positive way.[227]

The lack of a directed effort to educate key constituencies on the purpose and intended outcomes of the 9th ID experiments restrained the growth of the advocacy network. It also created opportunities for those who opposed the 9th ID's experimentation to stifle it. As one Congressional staffer commented after visiting the 9th ID in 1983:

> While General Meyer has given the Division his full support and protection, its future may be somewhat shaky when he leaves, depending on his successor. Elements in the Army view the free experimentation and openness of the 9th as threatening to "business as usual."[228]

---

[225] A review of Meyer's AUSA speeches and Green Book articles published within his Collected Works revealed only one instance (October 1980) where Meyer discussed the 9th ID experiments, GEN(R) Edward C. Meyer, *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983* (Washington, D.C.: Department of the Army, 1983), 125.

[226] Meyer's most significant discussion of the 9th ID during Congressional testimony came during a February 1983 House Appropriations Committee hearing when he discussed the status of the Division's experimentation and lauded its ability to accelerate the acquisition system. His comments came after a congressman asked him about the status of the 9th ID, not during his opening statements, Meyer, *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983*, 356.

[227] Report Regarding Oral History for Robert Elton, interview by Lieutenant Colonel Joseph W. Trez, Robert Elton Papers; Box 2, Oral History, U.S. Army Heritage and Education Center, accessed November 16, 2021, https://emu.usahec.org/alma/multimedia/902246/20182354MNBT1036357282F268628I001.pdf, 209.

[228] Robert E. Elton, "Corr. From Major General Robert E. Elton to Colonel Dacunto Re: Copy of Report Bill Lind Wrote w/Att," January 26, 1983, 9th Infantry Division Papers; Box 6B, Folder 12, U.S. Army Heritage and Education Center.

During one of General Meyer's last IPRs, he encouraged those involved with the HTLD to keep pushing forward, stating, "I am encouraged by everything I see here. You have struck deep. Now, we have got a bit deeper to strike."[229] Under his tenure, the HTLD had gone from an idea to its first large-scale experiment. General Meyer successfully installed the user-driven process he valued, generating a concept that combined technology with new tactics to produce a light division capable of fighting like a heavy division. While he was unsuccessful in building consensus across the defense policy subsystem, he ensured his ideas had a foothold within the Army and amongst defense policy leaders before the end of his term as CSA.

### C.5 The High Technology Motorized Division (1983-1985)

In the summer of 1983, Major General Robert RisCassi assumed command of the 9th ID and ADEA. An increased emphasis on the melding of training and experimentation characterized RisCassi's tenure as he ventured to prove the motorized concept's viability and value to the Army. RisCassi attempted to assuage FORSCOM's concerns about readiness while creating enough momentum with iterative experiments to build consensus external to the Division. Nevertheless, the tensions with TRADOC and CAC continued to challenge RisCassi. Meyer's successor, General John Wickham, remained supportive of the 9th ID and ADEA, often providing the Division the protection it required. However, his introduction of a parallel initiative, known as the 10K Light Division, emboldened TRADOC and restrained the 9th ID's consensus building efforts. As a result, despite a series of successful experiments culminating in exercise BORDER STAR in early 1985, the Division failed to build the support it needed.

---

[229] Meyer quoted by Huddleston in Huddleston, *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*, 233.

***Fusing experimentation and training to build a shared identity***

Before coming to Fort Lewis, RisCassi had served as the Assistant Commandant of the Infantry School at Fort Benning, which familiarized him with the HTLD and how external groups viewed it. RisCassi understood that "the bureaucratic system had a bias against the 9th ID and what was happening."[230] However, RisCassi felt he had all the resources and support to succeed. "I did not have to advocate for resources other than getting people to open their eyes and look to the future. The future was the only advocation that I needed."[231]

RisCassi balanced his vision of the future with ensuring the Division remained accountable to the present by ensuring the 9th ID remained tied to a selection of war plans. RisCassi felt this pressure kept those elements of the Division which had not transitioned to the HTLD engaged while keeping the Division relevant in the eyes of key organizations such as FORSCOM.[232] Internal to the Division, RisCassi used an organizational vision centered on the need to evolve the motorized concept.

> You've got this wheeled brigade out there that is motorized, one-third of the division. Then we had this other part, two-thirds, that wasn't motorized. We didn't hyphen it; we rolled the statuses all together. I found it was necessary. As soon as you showed a crack in your armor between the motorized and non-motorized portions of the Division, that was it.[233]

Like other specialized divisions that derived their organizational culture from their mission, such as airborne or air assault, RisCassi used the term "motorized" to focus the Division and build a sense of belonging. "The focus was on this 100 percent of the time.

---

[230] Interview with GEN(R) Robert W. RisCassi, interview by Ryan Kendall, June 3, 2021.
[231] Ibid.
[232] Ibid.
[233] Ibid.

Even if you weren't in a slice of the Division that was motorized, you were still talking about it as being motorized."[234]

***A new CSA and a new idea***

General John A. Wickham replaced General Meyer after serving as the Vice Chief of Staff of the Army in June 1983. Wickham was familiar with Meyer's HTLD efforts. He saw an element of continuity between him and Meyer, stating, "I sought to perpetuate [the HTLD] and try to capitalize on it."[235] Wickham demonstrated this continuity early on, signing the updated ADEA charter and approving refinements to the HTLD concept that evolved following LASER MACE.[236] In addition, the ADEA charter clearly articulated the role of the Commanding General as being in charge of both the HTLD and ADEA, thus protecting what General Meyer considered the most critical part: the users develop the concepts and associated technologies to address the operational problem.[237]

While Wickham supported the HTLD effort, he introduced a similar, yet divergent, theory of victory, which inspired more resistance from the bureaucracy. Before becoming CSA, Wickham organized a small group of officers led by Colin Powell to examine which programs to continue, end, and initiate quickly at the beginning of his term. Out of this study came an elite light infantry division concept, with 10,000 personnel and 500 aircraft sortie ceiling.[238] Wickham viewed this concept as emphasizing combat capability while reducing logistical requirements by increasing the number of infantry soldiers within a

---

[234] Ibid.

[235] General John A. Wickham, Senior Officer Oral History Program, interview by LTC Jose M. Alvarez, 1991, John A. Wickham, Jr. Papers; Box 4, Folder 1, U.S. Army Heritage and Education Center, 38.

[236] "Motorized Experience of the 9th Infantry Division 1980-1989," 290.

[237] Headquarters, Department of the Army, "Charter of the Army Development and Employment Agency," September 15, 1983, 9th Infantry Division (Motorized) Papers; Box 2b, Folder 20, U.S. Army Heritage and Education Center.

[238] A "sortie" in this case refers to one fully loaded transport aircraft, such as a C-141. The design criteria for the 10K light division was 500 separate aircraft loads to deploy the entire division.

division. Additionally, Wickham felt an emphasis on elite fighters would make the Army more warrior-oriented, facilitate deterrence efforts, and lead to more support from the public.[239] Wickham continued to sponsor and protect the HTLD for the long term. However, in the short term, the light division provided an option that he could quickly implement because it did not challenge existing thinking within the Army to the extent that 9th ID did.

Wickham charged TRADOC, led by General Richardson, with designing a 10,000-personnel light division. The task revitalized TRADOC's efforts, providing them an opportunity to return to the forefront of the Army's concepts development. Moreover, the effort received considerable attention from General Cavazos, the FORSCOM commander. In addition, the light division helped Wickham solve a significant force structure problem. Full transition to the Division 86 designs would cause the Army to break its manning ceiling. By pooling logistics resources outside the division, the light division design would create personnel spaces while providing a strategically flexible force.[240] As a result, the 10K division, as it was known, became the central focus of TRADOC, drawing attention from the HTLD.

Meanwhile, the HTLD continued to use experimentation to try to build support for its ideas. In September 1983, the HTLD and ADEA conducted exercise CABER TOSS focused on logistical operations. CABER TOSS was as much for the logistics proponents as it was for those internal to the Division. RisCassi saw CABER TOSS as an opportunity to bring the logistics community on board with the HTLD concept: "The logistics community was giving us a hard time…so we created CABER TOSS to show them the benefits."[241]

---

[239] Wickham, Senior Officer Oral History Program, 74-75.
[240] Summarized from Romjue's historiography of the Army of Excellence, Romjue, "The Army of Excellence. The Development of the 1980s Army."
[241] Interview with GEN(R) Robert W. RisCassi, interview by Ryan Kendall, June 3, 2021.

Specifically, the HTLD used the exercise to garner support for equipment like the Palletized Load System (PLS) and organizational concepts like the Forward Support Battalion. RisCassi lauded the exercise in a message to the Army senior leaders: "In sum, [field exercise] CABER TOSS accomplished much more than its mission of evaluating the logistical supportability of a High Technology Brigade- it provided valuable insights into the fundamental concepts of the Army's doctrine for logistical support."[242] RisCassi emphasized the Army-wide impact of the 9th ID's experimentation and how the exercise proved the viability of its concept.

Although RisCassi did not believe those in the Division felt they were in competition with the 10K Light Division, he knew "a lot of people [outside] did."[243] To avoid confusion with the light division that TRADOC was developing and reflect its unique capability, the High Technology Light Division became the High Technology Motorized Division (HTMD).[244] RisCassi continued to use experimentation and training to strengthen the division's shared identity and gain external support.

The Division's first experiment in 1984, LASER SHARP, occurred at the National Training Center in Fort Irwin, California, and served as the first time the HTMD had exercised the concept outside Fort Lewis and the Yakima Range. One senior officer recalled, "It surprised me how well it worked…the speed of the motorized division and the [anti-tank missiles] and how that could screw with tank brigades. Their ability to do it at night with the dune buggies really surprised me."[245] OCTOFOIL FOCUS continued RisCassi's emphasis

[242] Robert W. RisCassi, "Message Traffic from Major General Robert W. RisCassi To Various Regarding Fire Training Exercise Caber Toss Immediate Impressions," September 30, 1983, 9th Infantry Division Papers; Box 6c, Folder 23, Chap - 20 Caber Toss, [Part 5 Of 17], U.S. Army Heritage and Education Center.
[243] Interview with GEN(R) Robert W. RisCassi.
[244] "Motorized Experience of the 9th Infantry Division 1980-1989," 28.
[245] Interview with LTG(R) William S. Carpenter, interview by Ryan Kendall, September 28, 2021.

on training, ensuring the HTMD brigade was proficient on his surrogate equipment in preparation for LASER STRIKE, the Division's external evaluation.

LASER STRIKE in August 1983 was the HTMD's external evaluation before its culminating exercise BORDER STAR. It served as an opportunity for TRADOC and those outside the Division to see the motorized concept in action. Brigadier General Edwin Burba, the Infantry School Assistant Commandant, was one of the several visitors during the exercise. Burba recounted his impressions to RisCassi: "The 9th Division is a very important organization that we will support to the hilt. It is the only highly deployable tank killing division in the Army and therein lies its importance to all of us."[246] In an environment where ideas concerning light infantry were competing with one another, the HTMD's experiments continued to provide important opportunities to breed consensus. The HTMD underwent a Final Design Review from a panel comprised of TRADOC, DARCOM, ADEA, FORSCOM, and the 9th ID, resulting in a final report favorable to the HTMD. Wickham accepted the panel's recommendations, approved the final design, and determined that an interim division should be operational by October 1986, evidence of his continued support for the HTMD.[247]

### *Joint Readiness Exercise BORDER STAR*

Following Wickham's approval, the HTMD and ADEA continued preparations for Joint Readiness Exercise BORDER STAR scheduled for March 1985 in Fort Bliss, Texas. BORDER STAR would include a seven-day force-on-force free play exercise for the motorized portion of the HTMD against the 3d Armored Cavalry Regiment (ACR), a highly

---

[246] BG Edwin J. Burba, "Correspondence From Brigadier General Edwin J. Burba, Jr. To Major General Robert W. RisCassi Regarding Laser Strike Out Yakima," September 14, 1984, 9th Infantry Division Papers, 1980-1988; Box 16a, Folder 5, [Part 5 Of 12], U.S. Army Heritage and Education Center.
[247] "Motorized Experience of the 9th Infantry Division 1980-1989," 290.

maneuverable armored force. The exercise was an opportunity to evaluate the motorized concept and its significant components while experimenting with organizational designs and technologies.

Despite conducting the exercise with surrogate equipment, such as the manned RPV, the Chenoweth Fast Attack Vehicle, and the modified pick-up truck squad carriers, the HTMD proved successful against the 3d ACR. The HTMD conducted most of its operations at night, exploiting its night vision goggle capability while executing combined arms maneuver that leveraged its significant mobility and lethality. From the HTMD's perspective, BORDER STAR demonstrated the motorized concept's potential. Even with surrogate equipment, the HTMD had defeated a well-trained armored force equipped with advanced technologies:

> BORDER STAR again seemed to demonstrate the enormous combat destructive capability of an air-deployed motorized brigade. The 9th ID forces were able to wreck an imposing enemy armor force on each successive day…In our professional judgement, the [Organization and Operational] concept was again validated.[248]

Those outside the HTMD found their performance noteworthy. One senior officer noted that when he saw the 3d ACR commander a few years after BORDER STAR, the commander recalled how surprised he and his unit were by the HTMD and that they had "kick[ed] our [butts]."[249] Similar to previous experiments, RisCassi quickly distributed the results to Army senior leaders, highlighting both the evaluation aspects of the exercise and its value as a training event: "BORDER STAR provided valuable insights into a wide range of motorized issues…[and] was an excellent training experience that clearly demonstrated

[248] 3d Brigade, 9 Infantry Division (MTZ), "Border Star '85 Lessons Learned March 1985," March 1985, Stephen L. Bowman Papers; Box 10, Folder 6, Reports, January, February, And March 1985, U.S. Army Heritage and Education Center.
[249] Interview with LTG(R) Paul Mikolashek, interview by Ryan Kendall, April 22, 2021.

the combat readiness of the 9th ID (MTZ)."[250] Based on the HTMD's successful certification during LASER STRIKE and subsequent evaluation during BORDER STAR, it appeared that the motorized concept was positioned for success.

## D. EXPERIMENTATION OUTPUTS

### D.1 Social Consensus

As the experimentation process culminated, those involved with the HTMD had seemingly achieved everything Meyer would have wanted. The Division's certification and final evaluation, General Wickham's approval of the interim design, and the HTMD's successful effort at BORDER STAR served as positive indicators for implementation. However, following BORDER STAR, the HTMD underwent modifications and designs but never transitioned past its interim design. Consensus surrounding the HTMD initiative occurred only in small pockets within the Army, limited to piecemeal acceptance of technologies that supported various Army organizations.[251] As a result, the HTMD concept became wedged between the TRADOC products of Division 86 and the 10K Division. For the years after BORDER STAR, the HTMD existed as a lesser-than version of itself. The Division continued to rely on 18 types of surrogate equipment, as weapons and vehicles critical to the motorized concept faced many challenges in the acquisition process.[252] The

---

[250]Robert W. RisCassi, "Message Traffic from Major General Robert W. RisCassi To Various Regarding Joint Readiness Exercise Border Star Initial Impressions," April 1, 1985, 9th Infantry Division Papers, 1980-1988; Box 16a, Folder 10, DCCS/MCS 2, [Part 10 Of 12], U.S. Army Heritage and Education Center.

[251] Branch proponents implemented small pieces of the motorized concept in other organizations. Equipment, such as the Palletized Loading System (PLS) and the Avenger Air Defense system, and concepts such as the Forward Support Battalion came out of the experimentation process. See "Motorized Experience of the 9th Infantry Division 1980-1989."

[252] Robert W. RisCassi, "Message Traffic From Major General RisCassi For Various Regarding Status Of HTLD Design, With Attachment," November 29, 1983, William R. Richardson Papers; Box 45a, Folder 10, Commanding General TRADOC Back Channel Messages [Part 4 Of 5], OCT-DEC 1983, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/309779/20184115MNBT989109375F89612I008.pdf.

Division remained in its interim configuration until 1988, when it slowly transitioned away from the HTMD and was finally deactivated in 1991.[253]

How could what appeared to be a successful experimentation process fail to build consensus? Four factors impacted the 9th ID and its supporters' ability to build consensus around the HTMD. First, in the competition to define how a military should fight, experimentation provides a forum to persuade other groups that your idea is the right idea. Those who directly participate in the process can see the results for themselves and have the opportunity to debate the idea's merits. Elton and RisCassi used the process to build internal consensus and a shared identity around the Division. Experimentation also enabled them to persuade key groups, such as the logistics community.

Since the 9th ID was such a disruptive idea, the absence of a consistent and compelling external narrative undercut any attempts to build consensus around the concept. For those not present, experimentation can generate a narrative that helps explain a theory of victory, what it is, and why it is the right choice. Experimentation can continue to build on the narrative over time as it reveals new ideas or confirms hypotheses. However, there is limited evidence of such a narrative for the 9th ID in professional journals, branch proponent magazines, or trade journals.[254] As previously discussed, Meyer and Wickham did little to fill that void with their own public comments. One senior Army historian noted, "They simply didn't seek any kind of social integration."[255] In contrast, Division 86, Air Land Battle, and the 10K Light Division dominated the Army's professional forums.

---

253 "Motorized Experience of the 9th Infantry Division 1980-1989."

254 A survey of professional journals, such as *Military Review* and *Parameters*, branch proponent magazines, and trade journals found only a handful of articles about the 9th ID or the benefit of motorized infantry, such as Major Robert Perceval, "9th Infantry Division (Motorized)-Ready Now!," *Military Intelligence* 11, no. 2 (June 1985): 18–22; Colonel Hubba Wass de Czege, "Three Kinds of Infantry," *Infantry* 75, no. 4 (August 1985): 11–13; "US Army 9th Infantry Division: Experts in the Unconventional," *Defense Weekly*, October 26, 1985.

255 BG(R) Harold Nelson, interview by Ryan Kendall, January 6, 2022.

Second, the lack of an external narrative allows rival narratives to develop. For example, the 9th ID's reliance on surrogate equipment led to a narrative centered on its technologies rather than the innovative organizational designs and concepts. The moniker, the Toys R Us Division, reflected the low opinion of the 9th ID. These rival narratives fueled competing communities to smother a new community of practice before it could develop. Third, some leaders outside the Division did not view the FAVs as a credible military option. These opinions remained unchallenged without an external narrative to explain how they worked as part of a larger concept.

Finally, without a persuasive narrative, the 9th ID supporters could not effectively use experimentation to influence key groups that would help further legitimize its ideas. For example, new equipment represents a commitment and normalizes a new organization in the eyes of other groups. In the 9th ID, this did not happen for the equipment that mattered most to the concept's success. As a 9th ID senior leader pointed out when discussing the lack of Congressional support for the FAV:

> If we had been smart three years ago, we would have told everyone what we needed immediately. We did not have a good marketing scheme. We looked at it and said, 'this is so good a blind man can see it,' and then we found out that there were some blind men that could not see.[256]

Without a persuasive narrative, the 9th ID struggled to secure the equipment it needed. The longer the Division lacked the critical pieces of equipment for the motorized concept to work, the harder it was to build support for the HTMD.

### D.2 Strengthening the Advocacy Network

Throughout the experimentation process, Meyer, Wickham, and the 9th ID leadership worked to increase the size and strength of the advocacy network. However, the

[256] Armstrong, "Correspondence from General John A. Wickham, Jr. To Colonel Charles H. Armstrong Regarding ADEA and Internet Growth with Attachments."

lack of sufficient support from TRADOC, FORSCOM, and DARCOM hampered their efforts. First, too much of the work necessary to extend the advocacy network required Meyer's and Wickham's involvement. Meyer's initial efforts to connect the HTLD initiative with the Department of Defense, Congress, and other services successfully extended the network. Wickham approved the ADEA charter and highlighted the HTMD in speeches with lobbying groups.[257] However, over time their efforts alone were insufficient. Without the major headquarters championing the cause, most of the work to grow the advocacy network was left to the CSA and the 9th ID leadership. In comparison, during the New Louisiana Maneuvers, Sullivan had champions for his process at multiple levels and within various organizations throughout the policy subsystem (see Chapter 3).

Second, without the support of the major headquarters, the 9th ID commanders could not overcome the geographic separation from key policymaking entities and their position deep within the bureaucracy. As a result, the 9th ID Commander's advocacy efforts became limited to those who visited the 9th ID at Fort Lewis and those who worked with the Division and the HTTB. The 9th ID did have senior defense leaders, such as Secretary Weinberger and Congressional staffers, visit the 9th ID.[258] However, the 9th ID leadership had limited interactions with these individuals beyond the visits, and very few of these connections proved valuable in the long term. The Division leadership successfully extended the network to those who worked directly with the 9th ID. For example, the branch proponents' liaisons helped create connections with the lower echelons of TRADOC.[259]

---

[257] John A. Wickham, "Remarks Regarding World Affairs Council," January 23, 1984, John A. Wickham, Jr. Papers; Box 31b, Folder 47, Address at World Affairs Council Luncheon, Washington, DC, 23 January 1984, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/644211/20184897MNBW1013037582F435322I001.pdf.

[258] Interview with LTG(R) Patrick M. Hughes.

[259] As an example, Elton commented on the value of the Infantry LNO's update for spreading the 9th ID's ideas back to Infantry branch, Roberts Matthew, "Memorandum from Army Development and Employment Agency to Undetermined Re: Infantry LNO Monthly Report to MG Wetzel w/Atts," April 26, 1983, 9th Infantry Division Papers; Box 6b, Folder 13, U.S. Army Heritage and Education Center.

However, without TRADOC, FORSCOM, or DARCOM advocating on behalf of the 9th ID, the 9th ID's geographic and bureaucratic position made it too far removed the constituencies it needed to reach.

Finally, while the 9th ID did not have a strong advocacy network, TRADOC, the primary organization in the Division 86 community, did. TRADOC had a network connected to all the critical force development organizations by virtue of their mission. TRADOC's high degree of centrality allowed them to control information and who received it. The key portions of TRADOC's hierarchy, the Combined Arms Center and TRADOC Headquarters, served as the gatekeepers to the constituencies that mattered.

### D.3 New Communities of Practice

The motorized community of practice was unable to expand beyond the Fort Lewis area. Efforts to codify elements of the motorized concept into doctrine gained momentum at different points throughout the process but resulted in only draft doctrine that does not appear to have been widely distributed.[260] Additionally, General Shalikashvili, one of the last commanders of the 9th ID, highlighted that there were no schools to teach the motorized concepts or train individuals on how to use motorized infantry equipment. The training pipeline did not include soldiers' equipment as part of the motorized division. The 9th ID had to introduce all these aspects of a community of practice at Fort Lewis because they did not exist within the branch proponent sub-communities. Unlike other communities of practice, such as mechanization or aviation, there were no proponents to reinforce the conventions, norms, and beliefs that form the foundation of a community of practice.

[260] As late as April 1985, the motorized division did not have associated doctrinal publications as indicated in the doctrinal update in Infantry journal, Major Bruce D. Mackey, "Doctrinal Publications," *Infantry* 75, no. 2 (April 1985): 38–39.

Therefore, as the Division moved away from the original concept, the potential for a motorized infantry community of practice went with it.

## III. Conclusions

The 9th ID motorized experiments demonstrate how experimentation is a social process within which organizations, groups, and actors influence the ideological competition within a defense policy subsystem. Meyer's theory of victory that a light division could fight like a heavy division stood in stark contrast to the reigning ideological consensus in the Army of 1980. His theory sparked an ideological competition between communities that played out throughout the experimentation process, beginning with establishing the initial MOU and the differing perspectives on Meyer's guidance. The early 9th ID experiments challenged TRADOC's ID86 design and built enough initial momentum to enable the 9th ID to explore new concepts. Regardless, TRADOC and the other major headquarters seemingly held out in supporting the HTTB, as demonstrated by the reactions of those at the April 1982 IPR to Meyer. Additionally, the creation of ADEA and the dissent from the major headquarters signified the presence of a struggle that continued for the remainder of the 9th ID's experimentation process. Finally, the introduction of the 10K division strengthened TRADOC's position in this process, providing it a politically palatable initiative that placed them in the lead.

Senior sponsorship proved to be necessary but not sufficient. Despite all General Meyer's efforts, he could not turn the Army toward a High Technology Light Division within his tenure. While he effectively garnered resources and obtained initial buy-in from Secretary Brown, Meyer could not build consensus around his idea and an advocacy network that outlasted him. Additionally, the lack of support from the Army's major headquarters placed an excessive responsibility on him and the 9th ID to garner support for the concept.

General Wickham continued to provide the sponsorship the 9th ID needed, including hand-selecting RisCassi's successor and approving the ADEA charter.[261] However, this sponsorship alone was insufficient to build the support necessary to obtain the required equipment and broaden consensus in the Army for the HTMD.

Without an advocacy network of sufficient size and strength, the probability of transitioning from experimentation to implementation decreased. The 9th ID and HTTB, with the help of General Meyer, steadily increased the advocacy network from its small core up until the April 1982 CSA IPR. Meyer's approval of Elton's recommendations built a sense of urgency and excitement between the 9th ID and Meyer, even to the point where HQDA investigated the possibility of multiple HTLDs.[262] However, as the size and strength of the advocacy network plateaued, the transition to implementation slipped further and further away. Senior leaders who did not believe in the HTMD or its associated experimentation process continued to reinforce the divisions and resentment that existed at the beginning of the experimentation process.[263] Additionally, as those supporting the 10K division initiative developed their advocacy network, the HTMD's network began to decrease in size and strength, reducing the probability of its transition to implementation. Key entities, such as Congress, became less supportive and more speculative of the 9th ID as they sensed the lack of consensus within the Army. Without the network to help secure

---

[261] Charles H. Armstrong, "Correspondence from General John A. Wickham, Jr. To Colonel Charles H. Armstrong Regarding ADEA and Internet Growth with Attachments," February 18, 1986, John A. Wickham, Jr. Papers; Box 1a, Folder 2, Contents of Folder "A", [Part 1 of 4], 1986, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/765118/20184897MN006527.pdf.

[262] Meyer directed HQDA to examine the possibility of turning the 81st National Guard Brigade into a High Technology Light Brigade in Cerjan, "Memorandum for Record, Subj: Chief of Staff Army Briefing, 29 April 1982."

[263] Interviewees for this project consistently mentioned TRADOC's "not invented here" mentality. Since Meyer created the HTLD outside of TRADOC, anything associated with it was not a TRADOC product and therefore not worthy of consideration. This would manifest in both active and passive resistance.

resources and implement the concept at scale, the HTMD instead fell out of favor and was slowly marginalized over time.

In addition to the findings above, this case highlighted some additional policy implications. First, the 9th ID experimentation process highlights the increased importance of organizations, like TRADOC, with a significantly high degree of centrality relative to the rest of the policy system. For a disruptive innovation like the 9th ID, having the support of TRADOC could have opened multiple advocacy pathways and assisted the Division commander in garnering support for the motorized concept. For policymakers, the support of organizations like TRADOC, who have deep connections across the policy subsystem, becomes increasingly important the more disruptive the innovation. However, as this case highlights, senior leader sponsorship is insufficient. Therefore, early advocacy efforts should use the experimentation process to expose leaders from organizations such as TRADOC to the new ideas and concepts associated with the innovation.

In cases of highly disruptive innovations, experimentation is something that is best seen in person by senior leaders. As multiple interviewees pointed out, even leaders within the Division who participated in numerous experiments and professional debates about the concept remained skeptical until they saw the concept applied in a realistic setting.[264] Therefore, the advocates should bring in key leaders within the high centrality organizations early and often to see the associated organizations, technologies, and concepts. The more they interact with the process, the more they have the opportunity to voice their concerns, listen to new ideas, and feel a sense of connection to the innovation. As the 9th ID case demonstrates, having the support of leaders within these organizations is imperative for

[264] Interview with LTG(R) William S. Carpenter, interview by Ryan Kendall, September 28, 2021; Interview with LTG(R) Paul E. Blackwell, interview by Ryan Kendall, May 6, 2021.

disruptive innovation, and the experimentation process provides a mechanism to bring them on board.

Second, different communities have different expectations regarding the evidentiary standards and validity, which influence their willingness to accept something as true. These expectations shape what a community searches for prior to accepting results. In the 9th ID case, the testing and development community was similar to Congress. It expected to see objective data generated from a logical sequence to justify equipment and organizational designs. In contrast, the users focused more on trying out ideas within a background or scenario that roughly replicated what they expected warfare to be. For example, like Meyer, RisCassi was "more interested in the 70% solution and getting it into the field rather than waiting on the 100%."[265] These differing expectations led Congress and other senior officials to question why it should approve necessary equipment purchases.[266] The user group was not filling the expectation gap for a critical constituency. Policymakers must account for these differing thresholds to belief when constructing experiments and when communicating their results. The degree to which experimentation does not meet those thresholds increases the importance of having members of those communities witness the results to overcome speculation or bias.

[265] Interview with GEN(R) Robert W. RisCassi.

[266] "[Report of] Army Development and Employment Agency Input," July 5, 1983, 9th Infantry Division Papers; Box 6b, Folder 19, U.S. Army Heritage and Education Center.

# CHAPTER THREE: THE NEW LOUISIANA MANEUVERS AND FORCE XXI: SPONSORSHIP AND A STRONG ADVOCACY NETWORK

> America's Army was the best army in the world—a fact demonstrated in Panama less than six weeks later and in the Persian Gulf War less than a year and a half later. But we faced enormous uncertainty that day—the future was cloudy, dangerous, and ambiguous. The Army that showed such competence and flexibility on the battlefield had been perfected for a world that suddenly no longer existed.
>
> General Gordon Sullivan, *Hope is Not a Method* [267]

## I. Introduction

The Army's New Louisiana Maneuvers and Force XXI experiments during the 1990s highlight how the experimentation process builds consensus regarding a theory of victory. Supporters of the theory developed an advocacy network that diffused new ideas across organizational boundaries and set conditions for the transition to the implementation of an innovation. The New Louisiana Maneuvers and Force XXI experimentation processes provided Generals Gordon Sullivan and Dennis Reimer a way to build consensus around new ideas and new metrics of success within the Army while building support for their theory of victory throughout the defense policy subsystem. The combination their leadership and an advocacy network garnered sufficient support for the digitization of Army warfighting organizations and set conditions for the transition to implementation throughout the Army.

The following chapter examines this case study using the peacetime military experimentation framework to understand how a strong advocacy network impacts the transition to implementation as part of the posited causal mechanism. The following sub-section provides a background of the case study and summarizes the causal mechanism and

[267] Sullivan and Harper, *Hope Is Not a Method*, 4.

its associated context. The second section examines the experimentation framework and the impact of the advocacy network as it increased in size and strength over time. The final section discusses the associated findings and conclusions.

## BACKGROUND

When he assumed duties as the CSA in June 1991, General Gordon Sullivan understood that the security environment was changing, and that the Army would need to change with it. Potential changes to defense strategy in response to increased security challenges outside Europe had dominated defense policy thinking leading up to 1991. Reductions in Army force structure and an increased emphasis on strategic flexibility became the focal points of evolving policy.[268] The success of the Gulf War and the fall of the Soviet Union rapidly accelerated these changes. However, while Sullivan's immediate focus was leading the Army through a historic drawdown, he also saw the need to change how the Army thought about future warfare.

The US had benefited from technological overmatch during Panama and the Gulf War, two conflicts Sullivan thought offered a glimpse of warfare in the post-industrial age.[269] Sullivan saw the US straddling the end of the industrial period and the beginning of the post-industrial period.[270] His beliefs regarding the microprocessor's impact on warfare and the Army's increase in rapid deployments in support of what became known as Operations Other Than War (OOTW) shaped his ideas on future warfare. Sullivan's theory of victory was a force projection Army that integrated digital technologies to share information at the

---

[268] Jensen, *Forging the Sword,* 87-100.

[269] Gordon R. Sullivan, "Speech to the Land Warfare Forum, Arlington, VA, 9 January 1992, 'The Army in the Post-Industrial World,'" in *The Collected Works of the Thirty-Second Chief of Staff, United States Army: June 1991-June 1995* (Washington, D.C.: Department of the United States Army, 1996), 23-27.

[270] Ibid., 25. Sullivan uses the ideas of Toffler and Naisbitt, two influential futurists who wrote extensively about the impacts of technology on society, to argue that warfare was also subject to the impacts of the microchip. See also Sullivan and Harper, *Hope Is Not a Method,* 152.

speed necessary to effectively conduct a range of military operations, from peacetime engagement to major theater war, as part of a joint force to secure America's interests.

Historical accounts of General George Marshall's pre-WWII live field experiments, known as the Louisiana Maneuvers, shaped Sullivan's thinking. Sullivan sought a similar, systematized approach to change the Army.[271] The New Louisiana Maneuvers, unlike their namesake, were not maneuvers only in the physical sense. Instead, the New Louisiana Maneuvers primarily used live and virtual simulations as "a laboratory within which to develop and explore policy options for the full range of Title 10 and warfighting activities."[272] Sullivan emphasized that these experiments would examine organizational designs, technologies, and methods in various environments to redesign the Army from the "factory to the foxhole," generating policy options for senior leaders to debate and implement.[273] Sullivan knew the Army needed to explore digital technologies to build the Army of the information age. The New Louisiana Maneuvers experiments would fulfill this purpose.

Sullivan paired this experimentation process with a new corporate process that empowered multiple levels of Army senior leaders to nominate issues for experimentation and enabled Sullivan to build consensus internally to the Army.[274] Simultaneously, Sullivan and other senior leaders garnered support throughout the defense policy subsystem with key actors, groups, and organizations. Sullivan used speeches, Congressional testimony, and

---

[271] General George Marshall initiated the Louisiana Maneuvers in 1941 to provide the Army hands-on, practical application of new tactics, equipment, and organizational designs. The Maneuvers included General Headquarters exercises in Louisiana, Texas, and the Carolinas. Marshall used the field experiments to force-feed change within the Army in preparation for combat operations in World War II, see James L. Yarrison, *The Modern Louisiana Maneuvers* (Washington, D.C.: Center for Military History, 1999), https://catalog.hathitrust.org/Record/003483171, vi.

[272] Michael V. Harper, "CSA Expectations for Louisiana Maneuvers (DRAFT)," March 25, 1992, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

[273] Department of the Army, *Force XXI Operations: A Concept for the Evolution of Full-Dimension Operations for the Strategic Army of the Early Twenty-First Century* (Fort Monroe, VA: U.S. Army TRADOC, 1994).

[274] Summarized from Yarrison, *The Modern Louisiana Maneuvers*, 3.

letters to senior officers inside and outside the Army to extend the advocacy network.[275] Additionally, Sullivan's mobilized the Association of the United States Army (AUSA), increasing the frequency and size of its events, to engage industry partners, senior defense officials, and the media. Through these AUSA events, Sullivan brought the results of the New Louisiana Maneuvers events to key constituencies.

Sullivan instituted the Force XXI campaign to embed the change process within the Army while seizing on the momentum built as a result of the New Louisiana Maneuvers. The main focus of the Force XXI campaign was a series of Advanced Warfighting Experiments (AWEs). These experiments examined how information-age command and control capabilities, new weapon systems, increased intelligence capabilities, and new organizational structures impacted a combined arms force's lethality, survivability, and tempo.[276] The AWEs built on a series of earlier, smaller-scale experiments focused on battlefield digitization, defined as "the application of technologies to acquire, exchange, and employ timely digital information throughout the battlespace, tailored to the needs of each decision maker, shooter, and supporter."[277]

Sullivan's successor, General Dennis Reimer, provided the requisite senior leader sponsorship throughout the AWEs, empowering junior officers and fostering an innovative culture within the experimental force. Like Sullivan, Reimer used experimentation and a corporate process to build consensus and extend his advocacy network, successfully generating the seed corn of mid-grade and junior leaders who would constitute a new community of practice and the advocacy network required to transition to implementation.

---

[275] Sullivan referenced both the New Louisiana Maneuvers and Force XXI throughout multiple speeches, posture statements, and letters to general officers. One example is "Louisiana Maneuvers-Setting the Course" in Sullivan, *The Collected Works of the Thirty-Second Chief of Staff*, 202-203. Sullivan continued to advocate for the Army's experimentation efforts after he retired, highlighting the New Louisiana Maneuvers and Force XXI throughout his book, *Hope is not a Method*, published in 1996 which became a national best-seller.

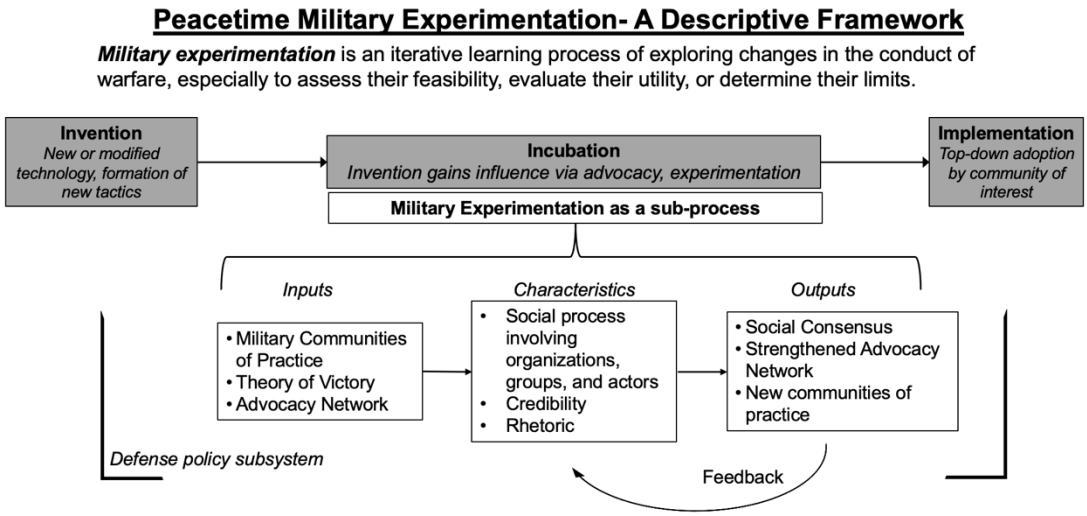
[276] Training and Doctrine Command, "TRADOC Force XXI Brown Card," 1997.

[277] Army Digitization Office, "Army Digitization Master Plan," 1995, 1.

By 1999, the Force XXI experiments successfully developed a prototype division, complete with one brigade equipped with applique technologies, new sustainment organizations, and improved intelligence capabilities.[278] The knowledge and consensus generated during the AWEs enabled Army leaders to rapidly scale up the prototype within lead units preparing for the US invasion of Iraq in 2003.[279]

## II. Applying the Framework

Figure 3.1: Peacetime Military Experimentation Framework




The following subsections will examine the experimentation process using the peacetime military experimentation framework above (see Figure 3.1). First, an overview of the defense policy subsystem during the early 1990s highlights key external events and internal parameters which shaped the policy subsystem. The next section examines the inputs to the experimentation process leading up to Sullivan's initiation of the New

[278] John Sloan Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005* (Washington, D.C.: Center for Military History, 2011), 183.
[279] LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022; LTG(R) William Campbell, interview by Ryan Kendall, January 14, 2022.

Louisiana Maneuvers. The third section discusses the characteristics of experimentation, focusing on the New Louisiana Maneuvers series of experiments and the Advanced Warfighting Experiments. The fourth section analyzes the outputs of experimentation. Finally, an ongoing assessment of the proposed causal mechanism occurs throughout each portion of the process.

## A. DEFENSE POLICY SUBSYSTEM

### A.1 External Events

"The Cold War is over, and a host of powerful forces is shaping a new international order with major implications for US national security policy and military strategy. We are at the end of a period of history that began with World War I."[280] This opening characterization of the strategic landscape in the 1992 National Military Strategy highlights the dramatic change to US defense policy created by the Gulf War and the fall of the Soviet Union. For decades US defense policy had optimized around one central focus, the Soviet Union, emphasizing forward defense in Central Europe. Now it would have to manage multiple potential threats and the geographic challenges that accompanied an increasing role as a global leader.

While few predicted the collapse of the Soviet Union, defense policy leaders had considered changes in defense strategy. For example, during the National Security Review 12 initiated by President Bush in March 1989, members of the Joint Chiefs cited the reduced risk of a Soviet attack on Western Europe and the increase of non-Soviet threats as reasons to shift defense policy away from a European focus.[281] Additionally, subsequent military leaders, such as the Chairman of the Joint Chiefs (CJCS), General Colin Powell, and the

[280] Colin L. Powell, "National Military Strategy," January 1, 1992, 1.
[281] Lorna S. Jaffe, "The Development of the Base Force 1989 - 1992:" (Fort Belvoir, VA: Defense Technical Information Center, July 1, 1993), https://doi.org/10.21236/ADA276236.

Chief of Staff of the Army (CSA), General Carl Vuono, initiated different studies that looked at the strategic environment of the 1990s. For example, Powell's "View of the 1990s" presentation imagined a future where a significantly reduced US military comprised of a Base Force provided sufficient capability to respond to increasing global threats. Additionally, Vuono's Antaeus Study examined the implications of a reduced Army forward posture in Europe to respond to growing force projection demands and the increasingly untenable costs of forward-deployed forces.[282]

With the Soviet Union no longer a threat, the implementation of policy changes explored within these studies accelerated. Most notably, Powell's Base Force became the backbone of the 1991 National Security Strategy and the 1992 National Military Strategy, changing the Army's focus from a forward-positioned deterrent of the Soviet Union to a predominantly US-based force focused on regional contingencies.[283] The new defense strategy and the resultant funding decrease accelerated the Army's drawdown and relocation of units from Europe back to the US, thus ensuring the post-Cold War Army would be different at least in size, positioning, and focus.

In addition to the fall of the Soviet Union, the Gulf War and the US invasion of Panama shaped the US defense policy subsystem in two ways. First, these events validated previous assessments that US security strategy should shift from focusing on the Soviet Union and Europe to regional threats.[284] Second, the Gulf War highlighted significant changes in the character of war. The proclaimed success of stealth, spaced-based

---

[282] For a summary of these studies see Jensen, *Forging the Sword,* 87-100.

[283] Colin L. Powell, "National Military Strategy," January 1, 1992, https://history.defense.gov/Portals/70/Documents/nms/nms1992.pdf?ver=AsfWYUHa-HtcvnGGAuWXAg%3d%3d; Herbert W. Bush, "National Security Strategy of the United States" (The White House, August 1991).

[284] Jaffe discusses how the Iraqi invasion of Kuwait strengthened arguments for a revised strategy that focused on addressing regional stability in Lorna S. Jaffe, "The Development of the Base Force 1989 - 1992:" (Fort Belvoir, VA: Defense Technical Information Center, July 1, 1993), 36.

technologies, information systems, and precision weaponry heralded a new warfare epoch. Reflecting on these events, General Sullivan noted that warfare was becoming characterized by increased precision, an expansion of the dimensions of the battlefield, and increased speed.[285] The importance of US technological superiority and its role in the changing character of war captured the attention of members of the US defense policy subsystem and that of its allies and competitors. Balancing the need for maintaining sufficient forces to achieve a new strategy while also preventing any loss of US technological superiority in a new era of warfare became a common area of concern and debate for defense policy leaders in the 1990s.

**A.2 Internal Parameters**

Four factors shaped the internal parameters of the defense policy subsystem leading up to the early 1990s. First, the Department of Defense Reorganization Act of 1986, commonly known as the Goldwater-Nichols Act, impacted the authorities and responsibilities of organizations and actors within the policy subsystem.[286] This legislation increased the Chairman of the Joint Chiefs' authorities, establishing the position as the senior military advisor to the President while diluting the influence of the service chiefs. Second, the Act increased civilian control of the military services by creating service Secretariats, politically appointed officials responsible for critical functions such as budgeting, research and development, and acquisition. Third, the Act elevated the authorities of joint theater commanders, defining their chain of command as direct reports to the Secretary of Defense, thus reducing the ability of the services to shape operations within

[285] Gordon R. Sullivan, "Speech to the Land Warfare Forum, Arlington, VA, 9 January 1992, 'The Army in the Post-Industrial World,'" in *The Collected Works of the Thirty-Second Chief of Staff, United States Army: June 1991-June 1995* (Washington, D.C.: Department of the United States Army, 1996), 23-27.
[286] James Locher's *Victory on the Potomac* provides a comprehensive historiography of the Goldwater-Nichols Act in James R. Locher III, *Victory on the Potomac: The Goldwater-Nichols Act Unifies the Pentagon* (College Station, TX: Texas A&M University Press, 2004).

those commands directly. Finally, the Act reflected Congress' exercising its powers to break down the service parochialism, which defined budget fights of the early 1980s and addressed concerns about ineffective integration during operations such as the failed Iran hostage rescue.[287]

Goldwater-Nichols diluted the CSA's formal power and influence and, therefore, their ability to lead change. The increased power of the Secretary of Defense, the CJCS, the Joint Staff, the service Secretariat, and the combatant commanders meant the CSA would have to find alternative sources of power and influence. The CSA was one of ten four-star generals within the Army, several of whom reported directly to someone outside the Army. Although each four-star did not possess the same formal or informal authority as the Chief, the CSA needed their buy-in to increase the likelihood any reforms would take hold.

Second, after budgetary growth during the first five years of the Reagan administration, Congress began to push for reduced defense budgets due to growing public sentiment for a peace dividend. While Congress paid attention to increased public opinion in favor of domestic spending and deficit reduction, the Bush Administration opted for a more cautious approach, recommending spreading defense cuts over several years. The topic of how much of the defense budget to reduce and how fast was placed on hold during the Gulf War, but quickly came back to the fore following the ouster of Saddam Hussein from Kuwait.[288] The dissolution of the Soviet Union left the Department of Defense with no unifying threat upon which to focus a strategy and associated budgetary requirements, thus increasing political pressure to reduce fiscal requirements. With an understanding that decreased budgets were likely, service chiefs became increasingly focused on managing force

---

[287] Summarized from a more in-depth analysis of Goldwater-Nichols Act's impact on the Army in Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005*, 41-44.

[288] Brown discusses Congress' and the Bush Administration's quick return to focusing on reducing the budget following the Gulf War in Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005*, 89.

structure reductions and the increasing tension between readiness to meet today's demands and the need to modernize for the 21st Century.

Third, internal to the Army, the Army's dominant performance in Panama and during the Gulf War validated the previous 20 years of effort building the All-Volunteer Force. The post-Vietnam Army senior leaders' establishment of Forces Command (FORSCOM) and Training and Doctrine Command (TRADOC) had generated the doctrine, training, and leaders that produced the world's preeminent army. FORSCOM developed the Army's combat readiness by implementing combined training centers and innovations in military training. TRADOC solidified its role as the source of all change, producing the doctrine and required capabilities for the modern Army. Additionally, the Army Material Command (AMC) had fielded the advanced equipment, such as the M1 Abrams and Apache helicopter, required to support the Army's combined arms maneuver doctrine, Air Land Battle. Finally, the Headquarters, Department of the Army had weathered the budgetary battles of the late 1970s and early 1980s and successfully shaped defense policy.[289] The Army's success reflected well on each major headquarters and strengthened their position within the Army as key components of success.

Fourth, through the 1980s, the Concepts-Based Requirements System (CBRS) shaped the roles, responsibilities, and relationships internal to the Army. The CBRS served as a standardized process for determining future weapons and force structure to meet the Army's roles and responsibilities within the national security strategy. CBRS identified the need for new or revised doctrine and defined the organizations, materiel, training, and leader development programs required to implement it. The process favored incremental and evolutionary changes, matching the similarly incremental advances in Soviet and Warsaw Pact capabilities while also ensuring any changes did not impact the required readiness of

[289] This chapter will refer to Headquarters, Department of the Army as either HQDA or "the Army staff."

existing forces. The CBRS involved numerous detailed steps that needed significant analysis, which were time-consuming and slow. Ironically, one senior officer described CBRS as "akin to Stalin's five-year plan."[290] Moreover, the CBRS was intermeshed with the Army's budgetary process, the Planning, Programming, and Budgeting System (PPBS). Therefore, it consumed significant bureaucratic energy as different organizations, groups, and actors fought to protect their bureaucratic interests.[291]

## B. EXPERIMENTATION INPUTS

### B.1 Military Communities of Practice

Existing military communities of practice, both internal and external to the Army, each possessed differing views on how the Army should change, if at all. Sullivan and his core advocacy group sought to establish a new community of practice for an Army in the information age by using the New Louisiana Maneuvers experimentation to identify the attributes, capabilities, and conventions for a force projection Army that exploited the power of digital information technologies to conduct a range of military operations, from peacekeeping to major theater war, in the post-Cold War era. Sullivan would need to garner support and ward off opposition from the following existing military communities of practice within the Army.

#### *Air Land Battle*

Air Land Battle, the doctrine that formed the intellectual foundation of the Army that fought in the Gulf War, also served as the defining feature of the most predominant community of practice in the Army. Within this community, combined arms maneuver with

[290] BG(R) Harold Nelson, interview by Ryan Kendall, January 6, 2022.
[291] Yarrison, *The Modern Louisiana Maneuvers*, 9-10; Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005*, 87.

mechanized forces supported by US airpower and precision weaponry formed the lens through which all problems would be solved. This community presented several challenges concerning change. First, if Air Land Battle was the framework for victory in warfare, CBRS was the force development process that ensured the right mix of tools. CBRS proponents were "many, vocal, and highly placed, with most believing that it and the Army's associated Cold War-based change processes were adequate, with only minor modifications."[292] CBRS was built based on a need to fight the Soviet Union at a moment's notice, favoring the sanctity of the Army's unit readiness over the need to change rapidly. By design, CBRS would serve as a restraint on any sweeping change efforts. Second, many within the Air Land Battle community saw the future Army as a smaller version of the Cold War Army. The Gulf War and Panama reinforced beliefs within this community that the Army only needed incremental improvements. Sullivan would have to convince those in the community that a smaller Cold War army was not the answer for the post-industrial age.

***Branches and Proponents***

Within the Air Land Battle community, there existed sub-communities of branches and proponents. The integrated nature of combined arms warfare created many opportunities for collaboration amongst the branches. However, in many cases, branches pursued federated programs, both in doctrine and acquisition, that supported their interests. Over time, branches became protective of their programs, especially in the post-Cold War environment of budgetary reductions. Additionally, many of these branch programs had been produced by the CBRS and therefore had layers of bureaucratic interests that constrained thinking and opposed any significant change. Due to the long-term nature of these programs, retired senior officers who had joined defense industry partners used their

[292] Yarrison, *The Modern Louisiana Maneuvers*, 10.

considerable power and influence to ensure programs, initiatives, and beliefs maintained the status quo as much as possible.[293] Any change efforts would have to focus on the branch's willingness to integrate within combined arms maneuver while simultaneously assuaging entrenched interests.

***Testing, Evaluation, and Acquisition***

Within the Army and the Department of Defense, the testing, evaluation, and acquisition community of practice formed the organizational backbone of much of the CBRS. Thus, it had a low tolerance for risk, as its charge was to ensure materiel met exacting standards for military operations and the scrutiny of Congress. Most importantly, the testing, evaluation, and acquisition community had very different conventions concerning experimentation compared with those in the operating force. Performance characteristics, specified by a very defined set of criteria, characterized testing and evaluation. Experimentation in the operational forces could not produce this level of rigor. Any experimentation effort within the Army had to address concerns about analytical rigor and the inability of peacetime experimentation to produce clear, irrefutable results. This became a significant issue with the development of information age systems that relied more on software and less on hardware, therefore requiring new measures of effectiveness. Within the Army, this included the Operational Test and Evaluation Command (OPTEC) at Fort Hood, Texas. OPTEC was a known entity to Department of Defense budgeteers, so their approval or disapproval of equipment carried a significant weight.

Additionally, as with the branch proponents, the acquisition community and associated interest groups often sought to perpetuate existing programs. Program Managers (PMs), Army officers charged with managing acquisition programs, had to fight for

[293] LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022.

continued budgetary resources in order for their program to survive, the metric of success for PMs. Survival of their program did not necessarily equate to positive outcomes for the Army. For example, command and control equipment programs sometimes included maintaining war reserves, even though the equipment was obsolete. The industries that supported these acquisition programs came with their own support from Congress, providing them the ability to serve as an obstacle to change. Any new community of practice that conflicted with these interests would most likely face significant opposition.

**B.2 Senior Leader Sponsorship and a Theory of Victory**

When General Gordon Sullivan assumed duties as the 32nd Chief of Staff of the Army in June 1991, the Army faced a changing domestic and international environment that did not fit its current design. As Sullivan later reflected, it became clear to many that "the Army that showed such competence and flexibility on the battlefield had been perfected for a world that suddenly no longer existed."[294] Rather than savor these victories, the Army had to face the challenges brought on by significant budgetary reductions and the need to maintain sufficient capability to address the panoply of uncertain challenges in a multi-polar international environment. Sullivan understood this challenge as the following:

> In the aftermath of these events, the challenge was to displace a sense of satisfaction with the Cold War, Panama, and the Persian Gulf and imbed a passion for growth. The challenge was to keep the Army ready to fight while we were demobilizing 600,000 people- something we had never done successfully in more than two hundred years of history. The challenge was to bring the alacrity and learning we had demonstrated on the battlefield into the bureaucracy. The challenge was to transform the Army, creating a future of service to America.[295]

Sullivan recognized that for the Army to adapt to the new environment and successfully navigate these challenges, he needed to communicate a direction, a theory of

[294] Sullivan and Harper, *Hope Is Not a Method*, 4.
[295] Ibid., 4.

victory for the new environment. To do this, Sullivan developed this vision for the Army, "a strategic force trained and ready to fight and achieve decisive victory wherever and whenever America calls."[296] Sullivan's theory of victory expressed in this vision statement was a sufficiently broad design not to predicate a definitive structure. Instead, his vision statement focused on the critical elements of what the Army had to become to fulfill its charter with the American people. A US-based force projection Army that served as a strategic asset for securing US interests around the globe was very different than the Army that existed at the end of the Cold War.

To orient the Army towards his vision, General Sullivan understood that he needed two things. First, he worked with TRADOC commander General Fred Franks to revise the Army's capstone doctrine, Field Manual 100-5, to update the Army's intellectual framework regarding military operations. The doctrine codified lessons learned regarding force projection from the Gulf War while establishing a new narrative for the post-Cold War Army. The new Field Manual included a description of the post-Cold War strategic context and introduced ideas such as force projection, mobilization, deployment and the continuum of military operations, including Operations Other Than War (OOTW).[297] Second, Sullivan needed a change process through which he could focus the Army and build consensus. From his experiences watching previous senior leaders, Sullivan knew that he had a short window to make decisions before people and organizations outside the Army made those

---

[296] Gordon R. Sullivan, *The Collected Works of the Thirty-Second Chief of Staff, United States Army: June 1991-June 1995* (Washington, D.C.: Department of the United States Army, 1996), 64.

[297] "[BRIEFING] Field Manual 100-5 Laydown," Force Development Office of The Deputy Assistant Chief of Staff for Operations and Plans Collection; Box 10c, Folder 28, FSN Agreed List, Number 30, FM 100-5, [Part 2 OF 5], U.S. Army Heritage and Education Center, accessed November 30, 2021, https://emu.usahec.org/alma/multimedia/347035/20183794MN000977.pdf; Frederick M. Franks, "Correspondence from General Frederick M. Franks Jr. To Fellow Soldiers Regarding Field Manual 100-5, Update/Changes," April 21, 1992, Field Manual 100 - 1 Historical Files; Box 3b, Folder 2, Coordinating Draft, Undetermined, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/360266/20182440MNBW1013040948F097571I008.pdf.

decisions for him.[298] Therefore, any change process would have to be agile enough to support a decision cycle that mirrored the accelerating change in the strategic environment.

If agility in decision-making was what Sullivan needed to change the Army, the established Army processes for change were anything but agile. The Concepts-Based Requirements System (CBRS) and the Planning, Programming, Budgeting, and Execution System (PPBS) incentivized incremental evolutions to address the incremental evolutions in Soviet capabilities. To bring the alacrity in learning the Army demonstrated at the operational and tactical levels during the post-Vietnam era, Sullivan understood that he would need a different process to redesign the Army for the changing world. As one senior aide noted, Sullivan had "a deep understanding that problems are generally not solvable from the same consciousness which created them."[299]

The process Sullivan wanted did not become clear to him until around October or November of 1991. After reading Christopher Gabel's account of the pre-World War II Louisiana Maneuvers, Sullivan understood more clearly what he wanted to do:

> I was always looking for a device to use to gain the imagination of the senior people in the Army to enable them to see the process that we would use to move ourselves forward. Louisiana Maneuvers is what I came up with. I read Gabel's book and said that's it. This is how I am going to do it. We will do some experiments. We will put the Army in the field and wargames, then we will experiment.[300]

In contrast to the original Louisiana Maneuvers, Sullivan intended to explore ideas using simulations that required fewer people and resources, thereby informing future experiments and avoiding what simulations would identify as dead ends. In addition, to promote a focus

---

[298] Yarrison, *The Modern Louisiana Maneuvers*, 8-9.

[299] Interview with COL(R) Mike Harper, interview by Ryan Kendall, August 18, 2021.

[300] COL John R. Dabrowski, ed., *An Oral History of General Gordon R. Sullivan* (Carlisle Barracks, PA: U.S. Army Military History Institute, 2008), 268.

on growth, Sullivan publicly focused his energy on the Louisiana Maneuvers and changing the Army, rather than the significant drawdown that was happening concurrently.[301]

**B.3 Core Advocacy Network**

General Sullivan's core advocacy network enabled him to rapidly diffuse his ideas throughout the defense policy subsystem and secure the resources necessary for experimentation. Sullivan had cultivated an extensive network through his years within the Army, building relationships both internal and external to the military. Therefore, his core advocacy network from the beginning enabled him to diffuse ideas into multiple constituencies across the policy subsystem while simultaneously providing a sensing mechanism for potential obstacles to change.

Internal to the Army, Sullivan's core advocacy network began with his personal CSA Study Group, headed by Colonel Mike Harper, which proved critical in helping Sullivan think through how to change the Army. Among the Army four-star generals, Sullivan had personal relationships developed over their more than thirty years of service. These relationships provided Sullivan a baseline understanding of who would support and who would not support his initiatives. General Carl Stiner, the Commander of US Special Operations Command, supported Sullivan's assessment of the changing strategic environment and the need for an increased emphasis on a wide range of military operations. Additionally, General Fred Franks, the TRADOC commander, shared similar views to Sullivan regarding the changing character of war. Although Sullivan and Franks at times differed on how and what to change, General Franks was an essential component of Sullivan's core network due to his informal power as a respected combat leader and his

[301] COL John R. Dabrowski, ed., *An Oral History of General Gordon R. Sullivan* (Carlisle Barracks, PA: U.S. Army Military History Institute, 2008), 269.

formal power as the TRADOC commander. TRADOC, with its high level of betweenness centrality due to its connections to the branch and proponent communities, would be essential to building consensus around a theory of victory. Finally, General Jim Ross, the commander of Army Materiel Command (AMC) supported Sullivan's early emphasis on logistics reform as a result of the Gulf War.[302]

Sullivan's previous experiences as a general officer had enabled him to establish relationships beyond the Army's uniformed members. Sullivan enjoyed a strong relationship with the Secretary of the Army, Michael Stone, and many of the Army Secretariat. In addition, Sullivan had established Congressional connections. As the Deputy Commandant of the Combined Arms Center in Fort Leavenworth, Kansas, Sullivan connected with Representative Ike Skelton. Similarly, as a Division Commander at Fort Riley, Kansas, Sullivan developed a relationship with Senator Bob Dole. Sullivan broadened his Congressional relationships in both the House and Senate during his time in the Pentagon. These relationships strengthened as Sullivan navigated the reduced budgets and drawdown of the Army.[303] Within the Department of Defense, Sullivan's core advocacy network extended to the Chairman of the Joint Chiefs, General Colin Powell, and key members of the Joint Staff, who, based on the new National Military Strategy, were open to new thinking and ideas regarding the Army. As advocates, they could help persuade civilian leaders within the Department of Defense. Finally, Sullivan had developed a close relationship with the President of the Association of the United States Army (AUSA), retired Army General Jack Merritt. AUSA, the Army's professional association, provided connections to defense industry, active duty personnel, and senior retired officers. For Sullivan, this core advocacy network provided the social infrastructure he needed to begin the experimentation process.

---

[302] BG(R) Harold Nelson, interview by Ryan Kendall, January 6, 2022.

[303] Michael Galloucis, interview by Ryan Kendall, January 7, 2021; Senior Staff Officer, interview by Ryan Kendall, January 3, 2022.

## C. CHARACTERISTICS OF EXPERIMENTATION

### C.1 The New Louisiana Maneuvers: Changing the way the Army changed

While navigating the significant turmoil caused by the drawdown from Europe and additional force cuts, Sullivan debated the substance and objectives of the New Louisiana Maneuvers with his CSA Study Group and senior officers on the Army staff. Sullivan outlined his initial concept for the New Louisiana Maneuvers in a message to the Army's senior officers in March 1992. He described the New Louisiana Maneuvers as "the laboratory in which we learn about the Army of the 21st Century."[304] Sullivan intended for the New Louisiana Maneuvers to examine Title 10 and warfighting issues "to give [senior leaders] a hands-on grasp for the post-Cold War Army and an understanding of change," using discrete but interconnected experiments.[305] In contrast to the Louisiana Maneuvers of 1939, Sullivan envisioned the New Louisiana Maneuvers as a process, "as a verb not a noun," that would be the way for senior leaders to hypothesize, experiment, and assess policy and warfighting issues.[306] Finally, Sullivan underscored he did not have a clear understanding of how the process would work or what it would produce: "I do not expect to end 1994 with truth with a capital 'T,' but I do expect to gain sufficient insight to give us policy options…to shape the Army of the 21st Century."[307]

The interconnected experiments would "harness the power of the microprocessor" through computer simulations that examined the Army's Title 10 responsibilities, such as "raising, equipping, maintaining, sustaining, and training the Army," and exploring new

304 Gordon R. Sullivan, *The Collected Works of the Thirty-Second Chief of Staff, United States Army: June 1991-June 1995* (Washington, D.C.: Department of the United States Army, 1996), 104.
305 Ibid., 104.
306 Ibid., 104.
307 Ibid., 105.

developments in warfighting.[308] Simulations of global contingencies would enable the Army staff to identify potential policy innovations that enabled the Army to meet the new National Military Strategy and associated force projection requirements. Just as the post-Vietnam Army trained in highly instrumented mock-battles at its Combat Training Centers (CTCs), Sullivan wanted the simulations to serve as a CTC for the Army staff and its senior leaders.[309] Additional smaller-scale simulations would serve as "skunkworks" exploring emerging technologies and concepts.[310]

The New Louisiana Maneuvers would begin in 1992, utilizing already scheduled exercises and simulations, such as REFORGER in Europe and ULCHI FOCUS LENS in Korea, to assess pilot projects and confirm the feasibility of the process. As the process developed, Sullivan envisioned using similar exercises for "playing software 'games within games'" that explored emerging technologies, organizational designs, and tactics.[311] Sullivan believed that by 1994 the New Louisiana Maneuvers would provide enough information to highlight specific policy issues for leaders to discuss and assess potential decisions. Sullivan saw these events as producing the analysis that facilitated the Army's preparation for the 21st Century: "It will be through the structured exchange of ideas and findings that we shall learn and grow."[312]

Sullivan's decision to conduct an experimentation process is significant for several reasons. First, he went against the institutional process, CBRS, that had created one of the

---

308 Louisiana Maneuvers Task Force, "Louisiana Maneuvers Board of Directors First Meeting," October 14, 1992, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

309 BG Harold Nelson describes the collection of reforms in the Army after Vietnam as the training revolution including the instrumented mock battles of the Combat Training Centers in Gordon R. Sullivan, "Message from General Gordon Sullivan to Brigadier General Harold Nelson Re: Grecian Urn," March 31, 1995, BG(R) Harold Nelson Personal Papers.

310 Gordon R. Sullivan, *The Collected Works of the Thirty-Second Chief of Staff, United States Army*, 104.

311 Gordon R. Sullivan, "MSG from CSA to Select General Officers, SUBJ: Louisiana Maneuvers 1994," March 9, 1992, Gordon R. Sullivan Papers; Box 75, Folder 2, Letters to Commanders, [Part 2 Of 2], Undetermined, U.S. Army Heritage and Education Center.

312 Ibid.

most impressive armies in US history. Sullivan did not have the authorities to change CBRS the way he wanted, so any attempts to change CBRS would be slow and produce only marginal results. While it is easy to argue this decision had to happen in hindsight, there was significant pressure on Sullivan to work within the existing Army system.[313] Second, rather than arguing for a particular organization design or pushing a specific kind of technology through the bureaucracy, Sullivan instead admitted upfront that the future was so uncertain he did not have all the answers. His willingness to launch a process with such uncertain outcomes stood in stark contrast to the well-defined problem-solving approaches of the Cold War that centered the Army's intellectual and bureaucratic capacity on defeating the Soviet Union. Rather than trying to define the new strategic environment with any specificity or orient the Army towards one particular threat, Sullivan instead embraced the uncertainty of the future and designed a process to take advantage of its possibilities.

Finally, Sullivan argued for the need to solve the Army's problems as a collective group, to pull new ideas up from within the institution, and make the hard decisions to accelerate change. Sullivan's argument was not strictly an act of humility. However, personal accounts of Sullivan's personality and character demonstrate that humility did play a significant role in the design of the New Louisiana Maneuvers.[314] Experimentation would provide the evidence Sullivan needed to build consensus amongst the senior leaders necessary to change the Army before it was too late while exposing a new generation of Army leaders to new ideas and methods.

---

[313] Yarrison documents how several senior leaders argued against a new process for fear that it would place any recommended changes at risk, Yarrison, *The Modern Louisiana Maneuvers*, 10.

[314] During interviews for this project, several officers who served on Sullivan's staff and those outside the Army with whom he interacted described both his intellect and his humility as setting him apart from other leaders during his time.

***New Louisiana Maneuvers Task Force***

Sullivan's March 1992 message served as a broad outline of his thinking regarding experimentation, but it lacked the details required to put his thoughts into action. Senior leaders and aides tried to understand what Sullivan wanted to do and argued for the best way from their perspective for him to achieve his goals. Some senior leaders cautioned against building an ad-hoc process or organization, fearing it would place the entire effort at risk. General Binnie Peay, the Army Director of Operations at the time, described this perspective:

> I had been with the 9th ID High Tech Test Bed and ADEA [Army Development and Employment Agency] process from the beginning. I saw firsthand how and why it failed. I did not want our Chief to not have the right organization for [Louisiana Maneuvers] or it would not survive.[315]

Despite these pressures to work within existing structures, Sullivan decided to establish a new organization, the New Louisiana Maneuvers Task Force (LAM Task Force),[316] that would report to him and perform the executive functions necessary for a campaign of linked experiments and the associated decision-making process.

In May 1992, Sullivan ended the debate with his Letter of Instruction (LOI) to the Task Force director, Brigadier General Tommy Franks, outlining the Task Force's purpose and scope and defining the responsibilities of the organizations and leaders involved with the Louisiana Maneuvers. Sullivan's staff widely distributed the LOI to ensure senior and mid-level Army leaders understood how the CSA expected the new change process to work. Sullivan initially positioned this new organization, the LAM Task Force, at Fort Monroe, Virginia, co-located with TRADOC headquarters, to separate it from the day-to-day

---

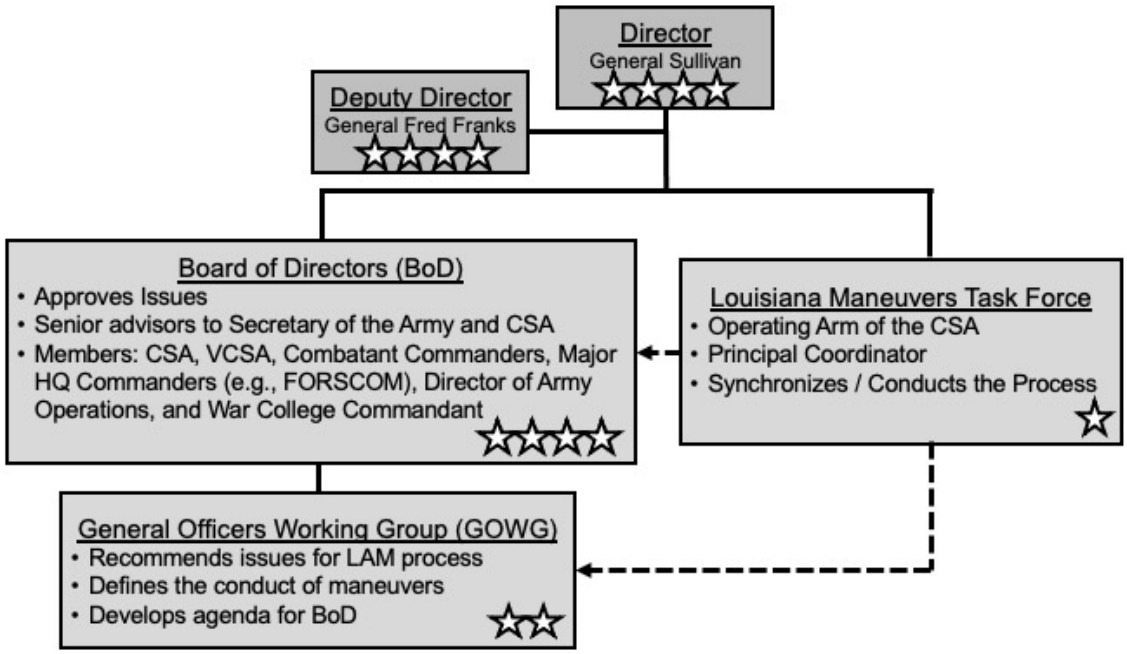
[315] Quoted in the endnotes of Chapter 1, "The Genesis of the Louisiana Maneuvers" in Yarrison, *The Modern Louisiana Maneuvers*, 27.

[316] From this point forward in this chapter, New Louisiana Maneuvers will be referred to as Louisiana Maneuvers and the New Louisiana Maneuvers Task Force will be referred to as the LAM Task Force. This aligns the dissertation's nomenclature with that of archival documents.

struggles of the Pentagon. Sullivan wanted Brigadier General Tommy Franks, as the Task Force Director, to integrate the different events, lessons learned, and exercise or simulation results "in a rational, structured way and to bring those outcomes to the senior leadership for informed policy deliberations."[317]

The Task Force and the General Officer Working Group and the Board of Directors comprised what Sullivan termed "the LAM Support System" (see Figure 3.2 below). This support system provided the structure, process, and information to help build the consensus needed to achieve Sullivan's vision.[318]

Figure 3.2: Louisiana Maneuvers Support System[319]




[317] For complete Letter of Instruction see Appendix H in Yarrison, *The Modern Louisiana Maneuvers*, 129.
[318] Ibid., 129.
[319] Figure derived from a LAM Task Force PowerPoint slide depicting the LAM Support System in Yarrison, *The Modern Louisiana Maneuvers*, 21.

### *A Corporate Process to Build Consensus*

The General Officers Working Group (GOWG) and a Board of Directors (BoD) comprised the Louisiana Maneuvers' corporate structure, generating debate and building consensus around ideas associated with the experimentation process. The GOWG, composed of one- and two-star generals from the Army's major headquarters and field units, examined policy and warfighting issues gathered by the Task Force. The issues nominated for debate or decision by the senior leaders would then flow to the BoD, which included the Army's four-star generals and select Army staff senior officers.[320] The corporate system set conditions for Sullivan to build consensus and make senior leaders feel empowered to change the Army. Additionally, the structure pushed the socialization of ideas and experimental results, such as the importance of space-based capabilities for Army operations and integration of night vision sensors, down several levels into the Army, expanding the advocacy network to the Army's future senior leaders.[321] Although Sullivan and Franks served respectively as the Director and Deputy Director of the Louisiana Maneuvers, the corporate structure made this change process one that placed ownership with the Army's senior leaders.

Key to the consensus building power of the BoD was the emphasis members placed on speaking with one voice. A senior aide described the process in the following quote:

> When you had a BoD meeting the members of the GOWG would go through Title 10 and Advanced Warfighting Experiment (AWE), and then everyone other than the four stars would be dismissed except for a few aides. The hardest decisions were when something in an AWE was successful, they would have to decide who was the

[320] GOWG members used an anonymous voting system to allow members to express opinions without opening conflicting with peers or superior officers at the meeting. See Yarrison, *The Modern Louisiana Maneuvers,* 38.

[321] Army senior leaders did not have a firm understanding of the importance of space-based capabilities for Army ground operations or what technologies and organizations they should pursue until the Louisiana Maneuvers. Additionally, proliferating night vision sensors within warfighting organizations was part of an initiative known as "Owning the Night" that came out of New Louisiana Maneuvers. For summaries of each of these see Yarrison, *The Modern Louisiana Maneuvers.*

> billpayer. These were the BoD's decisions, no one was king, it was the BoD decision. It was important when they walked out, they spoke with one voice. They would tell their staffs, 'Here is what we are going to do.'[322]

Every decision being a BoD decision was key to the social consensus process for two reasons. First, referring to all BoD outcomes as decisions made by the group took power away from individuals who might otherwise counteract a BoD decision. If Sullivan was willing to exercise deference to the BoD decisions, there was social pressure for the other senior leaders to do the same. Second, as the Army increased its interactions with entities throughout the policy subsystem, a messaging strategy that reflected the BoD decisions ensured consistency and helped push everyone in the same direction.[323]

To help Sullivan shape these BoD meetings, over time members of the Task Force served as strategic scouts, assessing resistance and support among Army senior leaders. This information was valuable for Sullivan to help him understand where to focus his energy and how to bring different personalities along. With a clear understanding of Sullivan's intent, the Task Force assuaged senior leaders' concerns during off-cycle meetings, often portraying that senior leader's organization as the priority on slides even though their particular issue was of lower overall importance to others. Additionally, Task Force members identified resistance and support amongst the senior colonels within the Pentagon. These key bureaucratic players often were either defending resources or trying to gain additional resources for programs based on legacy initiatives rather than BoD decisions. Task Force members helped to, as much as possible, reduce these bureaucratic roadblocks and the associated organizational friction.[324]

---

[322] Interview with COL(R) Rich Cowell, interview by Ryan Kendall, Phone, January 3, 2022.
[323] Ibid.
[324] Interview with Louisiana Task Force member, interview by Ryan Kendall, December 2021.

***The Maneuvers: Building momentum for change***

After an initial validation period in late 1992, the Louisiana Maneuvers began to resemble the military campaign Sullivan imagined. Increasingly sophisticated distributed computer simulations provided the infrastructure for experiments investigating warfighting issues and policy implications. In addition to exploring the Army's Title 10 responsibilities during CINC exercises,[325] the LAM Task Force developed annual GHQ exercises (GHQx) to experiment with policy initiatives using a variety of scenarios templated in 1999 with a downsized force projection army.[326] The Louisiana Task Force planners synchronized the GOWG and BoD process with experiments, AUSA events, and real-world operations. The interaction of the corporate process with experiments created a series of iterative feedback loops that helped build momentum within the Louisiana Maneuvers process.[327]

General Fred Franks and TRADOC emerged as an integral component of the Louisiana Maneuvers. TRADOC's Battle Labs, an initiative General Franks developed in May 1992, created opportunities for collaboration between branch school proponents, industry, academia, and representatives from operational units. The Labs utilized distributed simulations and live units during experiments focused on five battlefield dynamics, identified through a TRADOC analysis study as the areas of warfare having the most significant potential for change in the post-Cold War era. These experiments enabled the skunkworks that Sullivan originally foresaw. Franks viewed these Labs as integral to his efforts to inject

325 CINC exercises were annually scheduled exercises run by Commander-in-Chiefs of regional commands, such as United States Forces Korea.
326 Lieutenant Colonel John C. Dibert, "General Headquarters Insights," *Military Review* 77, no. 2 (April 1997): 61–67.
327 Louisiana Maneuvers Task Force, "Winter Senior Commanders Conference," March 4, 1994, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

new ideas into the TRADOC combat development process and supported how Sullivan wanted to use the Louisiana Maneuvers.[328]

The Battle Labs proved to be an important source of ideas and information to support the Louisiana Maneuvers BoD process. The Battle Labs could conduct experiments faster than the larger, more expensive, and more cumbersome experiments associated with annual exercises, allowing for a faster iterative exploration of ideas. Battle Lab experiments provided constructive closed-loop simulations of combat organizations and identified potential areas for expanded investment while also preventing allocating resources towards ideas that initially seemed promising but, after further examination, lost their appeal. Additionally, the Battle Lab's distributed experiments increased demand on the Army's simulation capability. Over time the increased demand led to increased resources and sophistication as the Army sought to take advantage of advancements in simulation technologies. Finally, as an advocacy building tool, the Battle Lab experiments brought in other services, allies, and partners to exchange ideas, share resources, and build support across the policy subsystem for Army initiatives. The Battle Labs also became a consistent feature at Association of the United States Army (AUSA) events, showcasing the Army's efforts to move into the information age to key defense policy constituencies.[329]

---

[328] The TRADOC study identified the five battlefield dynamics as Early Entry Lethality and Survivability, Depth and Simultaneous Attack, Battle Space, Command and Control on the Move--Controlling the Tempo, and Combat Service Support. These battlefield dynamics served as a focus of doctrine revisions and experimentation. Frederick M. Franks, "[Memorandum] Battle Labs," May 1992, Gordon R. Sullivan Papers; Box 212, Folder 5, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/954550/20184531MNBW1013046983F00000003648901001.pdf.

[329] A Battle Lab pamphlet released after the first year of the Louisiana Maneuvers highlights the creation, evolution, and achievements of the Battle Labs leading up to the Force XXI campaign. Franks highlights the involvement of industry, allies, and other services. See General Frederick M. Franks, "Battle Labs: Maintaining the Edge" (United States Army Training and Doctrine Command, May 1994). Additionally, LTG(R) Funk described in an interview how the Mounted Battlespace Battle Lab connected to a floor display at the AUSA event in Orlando highlighted the Army's simulation capabilities, Interview with LTG(R) Paul Funk, interview by Ryan Kendall, September 24, 2020.

**C.2 An Information Age Army- building consensus for a digitized Army**

Of all the issues presented to the BoD as part of the New Louisiana Maneuvers from 1992 to 1994, the integration of digital technologies had the most profound impact on the Army. Experimentation with digital technologies in weapon systems began in early 1992 at the Mounted Battlespace Battle Lab (MBBL) at Fort Knox, Kentucky. Then, in September 1992, a platoon of the new M1A2 tanks equipped with an InterVehicular Information System (IVIS) demonstrated the potential of digital technologies at the NTC, albeit on a small scale.[330] The results of these early experiments led to the digitization[331] of the battlefield being one of five warfighting issues presented at the 1992 BoD.[332] From that point forward, digitization became a focus of experiments throughout the LAM process.

A series of iterative experiments that increased in scale and complexity continued to provide opportunities to increase the exposure of senior leaders and defense policymakers to digital technologies and help a broader audience imagine how these technologies would impact the Army at the tactical level. After the second BoD meeting in March 1993, Sullivan noted, "The digitized battlefield provides the greatest leverage to develop a smaller and more capable Army."[333] In addition to building consensus for digitization among the Army's senior leaders, Sullivan also used the experimentation efforts to convince senior DoD officials of digitization's merits. Following a visit to Fort Knox to receive a demonstration from the MBBL, the Undersecretary of Defense for Acquisition, John Deutch, lauded the

---

330 Yarrison, *The Modern Louisiana Maneuvers*, 119.

331 In November 1993 the Army's Digitization Standing Task Force defined digitization as: "The application of digital technologies to acquire, exchange, and employ timely digital information throughout the battlespace tailored to the needs of each force element. Digitization allows deciders, shooters, and supporters at all levels to maintain clear and accurate pictures of their respective battlespace," quoted in Yarrison, *The Modern Louisiana Maneuvers*, 122.

332 Louisiana Maneuvers Task Force, "Louisiana Maneuvers Board of Directors First Meeting," October 14, 1992, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

333 Sullivan quoted in Yarrison, *The Modern Louisiana Maneuvers*, 121.

Army's forward-thinking and support for its digitization efforts.[334] Less than a month after Deutch's visit, the House Appropriation committee designated $20 million to the Army for its digitization efforts.[335] While there is no evidence to link Deutch's visit with the increase in appropriated money, the two combined are indicative of the growing support for the Army's efforts throughout the policy subsystem.

With each iteration of experiments, digitization drew more and more attention. Ad hoc organizations were formed to investigate the acquisition requirements associated with continued experimentation and future digital hardware and software prototyping. In December 1993, Sullivan approved a Digitization Special Task Force to help manage digitization efforts across the different branches, identify technologies to pursue, potential modernization strategies, and the associated timelines.[336] Momentum for digitization as a critical component of the Army Sullivan envisioned grew with each experiment and the organizational energy associated with the new staff organizations such as the Standing Task Force.

### *Advanced Warfighting Experiment Desert Hammer*

After observing the Army's first battalion-level Advanced Warfighting Experiment, DESERT HAMMER VI, in April 1994 at the National Training Center, General Franks sent a message to General Sullivan: "Convinced that during AWE 94-07 on the NTC battlefield, we wrote the first page of the new book on land warfare."[337] After multiple demonstrations

---

[334] John M. Deutch, "Memo from Under Sec of Defense to CSA SUBJ: Non-Line of Sight-Combined Arms Missile Systems," September 13, 1993, Gordon R. Sullivan papers; November 1993 Correspondence, Flag Letters, Messages, General Office Files, Acting Secretary of the Army Files, Box 137A, Folder 1, U.S. Army Heritage and Education Center.

[335] Yarrison, *The Modern Louisiana Maneuvers*, 121.

[336] Ibid., 122.

[337] Frederick M. Franks, "Message Traffic From Frederick M. Franks To General Sullivan; General Reimer Regarding AWE 94-07 Hot Wash," April 26, 1994, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/983615/20181815MNBT989112210F401649I011.pdf.

and experiments at the NTC and the Battle Labs, the experiment represented a significant step forward. It involved 44 different agencies and equipment in various stages of development. As Sullivan later recounted, "In some cases the troops were literally lashing the laptops into the tanks with duct tape."[338] The digitally equipped battalion had performed overall much better than a standard force, and Sullivan gave enough proof that he should press ahead with the "information-based redesign of 21st Century operational force, later termed Force XXI."[339]

DESERT HAMMER became what Sullivan later referred to as a "thin thread," a prototype that represented the possibility of a more significant transformation. As a thin thread, DESERT HAMMER ended up being a foothold in the future. Sullivan later described the experiment's impact:

> By most measures, the digital task force destroyed more of the enemy force and suffered fewer losses…when it was all over, the water was muddy…but we had been able to demonstrate the power of the microprocessor on the battlefield…we had opened the door to the future, and from that time forward there was no looking back.[340]

By providing Army senior leaders an example of what could be, the experiment's results had significant power and helped to construct a stronger belief in the role of digital technologies in warfare. For several officers like General Fred Franks, DESERT HAMMER served as Gestalt switch. Once he had seen the potential of a combat arms organization equipped by digital technologies, he could not unsee it. More important, what those at DESERT HAMMER had seen motivated them to devote their energy towards bringing the digital force to fruition.[341]

---

[338] Sullivan and Harper, *Hope Is Not a Method*, 175.
[339] General Gordon Sullivan quoted in Yarrison, *The Modern Louisiana Maneuvers*, 41.
[340] Sullivan and Harper, *Hope Is Not a Method*, 16.
[341] Franks highlights the cumulative impact of experiments such as DESERT HAMMER on his belief in digital technologies in warfare in the endnotes of Chapter 2 in Yarrison, *The Modern Louisiana Maneuvers*, 52.

### C.3 Expanding the network and building consensus

In addition to the corporate structure's social process, Sullivan and the LAM Task Force integrated internal and external communications into the campaign through various mechanisms. For example, Sullivan leveraged the Association of the United States Army (AUSA) as a platform to promote the New Louisiana Maneuvers and extend the Army's advocacy network deeper into the policy subsystem. AUSA had traditionally held one annual event, a convention in Washington, DC, that brought together Army leadership, retired senior leaders, and industry.[342] Sullivan's relationship with the AUSA president, GEN(R) Jack Merritt, gave him a strong partner willing to expand AUSA's role. As a result, AUSA increased the number of events from one to three a year, varying their geographic locations to reach a wider audience. Sullivan used these events to bring the Army's experiments to a larger audience, including mock-ups of simulations and videos discussing Battle Lab experiments, each highlighting how the Army was using information technologies.[343]

Sullivan sent out personal invites to Congressional officials and staffers, Senior DoD leadership, and industry representatives while setting aside time to discuss the latest Army experiments, initiatives, and emerging technologies with a collection of allies and partners.[344] For example, at the 1993 AUSA annual convention in Washington, DC, Sullivan escorted Secretary of Defense William Perry through a floor display highlighting the Army's use of

---

Other senior officers, such as then MG William Campbell, who attended the experiment became invaluable leaders in future experiments, LTG(R) William Campbell, interview by Ryan Kendall, January 14, 2022.

[342] Sullivan's approach was distinct from his predecessor. While the previous Chief of Staff, General Vuono, had limited public engagements with AUSA, Sullivan saw the organization as critical to his advocacy building efforts.

[343] Louisiana Maneuvers Task Force, "October AUSA Theme: America's Army...Count on Us," June 16, 1993, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

[344] Gordon R. Sullivan, "CSA Letters to OSD and SASC," September 29, 1993, Gordon R. Sullivan Papers; November 1993 Correspondence, Flag Letters, Messages, General Office Files, Acting Secretary of the Army Files, Box 137A, Folder 7, U.S. Army Heritage and Education Center; Sullivan hosted a special meeting with international partners interested in digitization, Interview with LTG(R) David H. Ohle, interview by Ryan Kendall, December 17, 2021.

simulations and experiments from concept development to materiel production.[345] Sullivan also used the AUSA annual conventions to connect with allied and partner nations, introducing them to some of the early digitization concepts. AUSA events remained a planning priority for the LAM Task Force, with AUSA events organized around BoD meetings and experiments.[346]

An excerpt from General Sullivan's trip report following the May 1993 AUSA event in Orlando, Florida, provides insight into how he valued these events as an advocacy building tool:

> I was very pleased by the media and Congressional staff participation. The direct benefit to the Army was immediately evident in the media coverage and there will be indirect benefits. I want to ensure we are as aggressive in the future in getting media and Congressional participation.[347]

In his opening remarks for the event, Sullivan stressed that everyone present was part of America's Army, describing how the relationships between the Army, industry, and Congress had been critical to the Army's historical successes.[348]

In addition to AUSA events, the Louisiana Maneuvers process and its associated experiments helped build relationships with key private companies supportive of the Army's efforts. For example, following a digitized force experiment at the National Training Center

---

345 "Itinerary Regarding Louisiana Maneuvers Board Of Directors Meeting, Escort Bill Perry Through Concept To Production," October 20, 1993, Gordon R. Sullivan Papers; Box 320, Folder 8B, CSA's Meeting Memorandums For Record [Part 2 Of 2], September-October 1993, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/972120/20184531MNBT991895999F259571I015.pdf.

346 Multiple planning documents show the AUSA events overlaid on timelines with key experiments and corporate meetings. Synchronizing these events ensured maximum participation from both the Army's senior leaders, industry, and Congress. See Louisiana Maneuvers Task Force, "October AUSA Theme: America's Army...Count on Us," June 16, 1993, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

347 Gordon R. Sullivan, "Trip to Orlando, FL and Fort Leavenworth, KS, 24-26 May 1993," May 28, 1993, Sullivan Papers, Box 75, Folder 6, Army Heritage and Education Center.

348 Speech at the Association of the United States Army (AUSA) Winter Symposium, Orlando, FL, 9 February 1993 in Gordon R. Sullivan, *The Collected Works of the Thirty-Second Chief of Staff, United States Army: June 1991-June 1995* (Washington, D.C.: Department of the United States Army, 1996), 132-137.

(NTC), Steve Ballmer, second in charge to Microsoft CEO Bill Gates, met with BG Dave Ohle, the Director of the Louisiana Maneuvers Task Force. Their conversation included Ohle describing the Army's digitization work over a series of paper maps and led to Ballmer inviting Ohle to serve on Microsoft's Executive Council, an unprecedented opportunity.[349] The relationship between the Army and Microsoft included sharing of ideas and concepts for information technologies and access to early prototypes. One such Microsoft prototype provided a digital communications platform for the Army senior general officers.[350] This introduction of new ideas helped expose Army senior leaders to the latest technologies and concepts from the private sector, furthering social consensus.

Despite the significance and effectiveness of Sullivan's advocacy-building effort, it was not successful in every case. Externally, Sullivan was not able to convince subsets of specific communities. For example, when discussing the community of retired senior officers, Sullivan described some of his struggles:

> I felt Jack Merritt and AUSA was the gateway to the Army retired community and, I thought, support. While it did allow me to get our ideas out . . . it never really gave me access to [ the] intellectual support I sought. Rather, we were critiqued. Some of the criticism was necessary and helpful, but I never felt [their] complete understanding of our quest for their support for change and growth. Perhaps my greatest failure in this context was my failure to understand that the 'AUSA community' is not a community but a complex gathering of interested folks. I now know this.[351]

Internally, Sullivan's desire for a greater magnitude of change in certain areas met with resistance among other senior leaders. Some senior leaders did not wholly buy into the Louisiana Maneuvers process either because they did not believe in it or because it

[349] Interview with LTG(R) David H. Ohle, interview by Ryan Kendall, December 17, 2021.
[350] Interview with COL(R) Rich Cowell, interview by Ryan Kendall, Phone, January 3, 2022.
[351] Yarrison, *The Modern Louisiana Maneuvers*, 55.

threatened their power.[352] Sullivan reflected on this resistance in an interview after his retirement: "Certainly there was never universal, or even inner circle, acceptance of [LAM Task Force] or [Louisiana Maneuvers], but I never felt it was personal."[353] As further evidence, when examining the redesign of the division, the Army's principal tactical combat organization, Franks warned Sullivan against trying to make significant changes:

> Do not want to overstate this, but believe large changes to current division will go down hard. No problem with bold changes for the long-range design that will get discussed, analyzed, be subject of experimentation in Prairie Warrior, etc. but some resistance to near-term changes beyond what you normally get in force design update sessions.[354]

This statement is evidence of the challenges Sullivan faced when building consensus for different initiatives. The advocacy network provided not only support, but also a mechanism for sensing what the senior leaders would accept. With this understanding, Sullivan would continue to use the experimentation process as a persuasion tool to convince the senior leadership that changes were warranted and necessary.

Despite these challenges, the size and strength of Sullivan's advocacy network grew significantly during the Louisiana Maneuvers. Internal to the Army, the Louisiana Maneuvers enabled Sullivan to diffuse ideas down through the multiple bureaucratic layers of the Army, exposing the next generation of senior leaders to new concepts and ways to change the Army. Some members of the GOWG, such as General

---

[352] Sullivan reflected on his ability to bring senior leaders on board with the Louisiana Maneuvers, "I thought I would get energetic support from the generals. I am not sure they all saw it" in COL John R. Dabrowski, ed., *An Oral History of General Gordon R. Sullivan*, 268; Senior aides confirmed some General officers not only did not buy-in to the process, but at times they took actions counter to the BoD decisions, Senior Staff Officer, interview by Ryan Kendall, January 3, 2022.

[353] James L. Yarrison, "Memorandum From James L. Yarrison To Undetermined Regarding Interview With General (Ret.) Gordon R. Sullivan," April 18, 2001, Gordon R. Sullivan Papers; Box 287, Folder 7, The Modern Louisiana Maneuvers, Undetermined, U.S. Army Heritage and Education Center, https://emu.usahec.org/alma/multimedia/962478/20184531MNBT991895797F365086I001.pdf.

[354] Frederick Franks, "MSG from CDR, TRADOC SUBJECT: Division Redesign," March 29, 1993, Gordon R. Sullivan Papers; CSA Historical Files March 1993 Correspondence, Flag Letters, Messages, General Office Files, Box 129, Folder 11, U.S. Army Heritage and Education Center.

Rick Shinseki, became ardent supporters of Sullivan's theory of victory and the Army of the 21st Century that the Louisiana Maneuvers helped them imagine. Franks' Battle Labs had provided glimpses of the 21st Century Army, adding to the core advocacy network of senior officers who would continue the hard work of experimentation.

Finally, a steady stream of articles, speeches, and videos had helped communicate how the Army was changing and different ideas concerning future warfare. For example, Sullivan and one of his senior officers, Colonel Jim Dubik, co-authored a collection of articles that analyzed the future strategic environment, organizational change due to technological and social evolution, and the impacts of information processing technologies on warfare.[355] This stream of new ideas sparked a broader discussion including mid-grade and senior officers who responded with articles in professional journals indicating the acceptance and debate on these ideas.[356] For example, General Franks published articles discussing the Army's new doctrine, while mid-grade officers and War College professors wrote articles discussing the role of information technologies in future warfare that appeared in *Parameters*, *Army* magazine, and branch journals such as *Engineer*.[357]

---

[355] The titles of the three papers are representative of Sullivan's thinking regarding future warfare and the changes facing the Army: "Land Warfare in the 21st Century," "Ulysses S. Grant and America's Power Projection Army," and "War in the Information Age," Gordon R. Sullivan and James M. Dubik, *Envisioning Future Warfare* (Fort Leavenworth, KS: US Army Command and General Staff College Press, 1995).

[356] Sullivan and other senior officers authored articles in different professional journals and media outlets to reach a variety of different audiences. In particular, *Military Review* and *Parameters* enabled Sullivan to reach different tiers of the Officer corps. His ideas and the issues coming out of the Louisiana Maneuvers generated articles from a variety of different individuals and groups helping to broaden consensus within the force.

[357] Articles discussing the changing strategic environment, the future of warfare, and the role of information technologies came from senior officers, mid-grade officers, and PME institution professors, as mentioned in Jensen, *Forging the Sword*, 179. For examples see David Jablonsky, "US Military Doctrine and the Revolution in Military Affairs," *Parameters* 24, no. 1 (1994): 18–36; James R. McDonough, "Versatility: The Fifth Tenet," *Military Review* 73, no. 12 (1993): 11–14; Engineer School Task Force XXI, "Shaping Force XXI Engineers," *Engineer* 24 (April 1995): 2–11; John W. Reitz, "Managing Intellectual Change: Army's Revision of FM 100-5," *Army*, September 1992; General Frederick M. Franks, "Full-Dimensional Operations: A Doctrine for an Era of Change," *Military Review* 72, no. 12 (1993): 5–10.

External to the Army, the LAM Task Force's and Battle Labs' interactions with industry had given the Army access to partnerships that helped accelerate the iterative experimentation process and expose Army leaders to new ideas in the form of technologies and organizational designs. Additionally, Sullivan and other senior leaders' efforts to garner support with senior members of the Department of Defense had resulted in increased funding and pledges of support for future initiatives. Most notably, the Battle Labs experiments with horizontal technology integrations, such as equipping combined arms forces with digital command and control technologies and second generation Forward Looking Infrared (FLIR) sensors, sparked interest from Secretary Perry. His support enabled the Army to accelerate and prioritize its acquisition efforts, setting the stage for future digitization experiments.[358] The expansion of the advocacy network proved critical to the early successes of the Louisiana Maneuvers and set conditions for the Army to transition to its next campaign of experimentation, Force XXI.

### C.4 Force XXI: The emergence of a new community of practice

#### *The Force XXI Campaign*

> I think we have constructed a process which will enable us to coherently transform the institution, writ large, now we must create a design our subordinates can touch-a Grecian urn. If Force XXI is a thing, what does it look like?[359]

The New Louisiana Maneuvers and associated experimentation provided the process through which General Sullivan built consensus within the Army's senior leadership while extending the size and strength of the advocacy network throughout the defense policy subsystem. The success of DESERT HAMMER, combined with new space technologies

[358] Frederick Franks, "MSG from CDR, TRADOC to CSA SUBJ: Silver Bullet Programs," September 2, 1993, Gordon R. Sullivan Papers; November 1993 Correspondence, Flag Letters, Messages, General Office Files, Acting Secretary of the Army Files, Box 137B, Folder 14, U.S. Army Heritage and Education Center.
[359] General Gordon Sullivan in a letter to the Vice Chief of Staff of the Army, General Tilelli, 28 August 1994, quoted in Yarrison, *The Modern Louisiana Maneuvers*, 69.

and force projection experiments, accelerated senior leaders' belief in Sullivan's vision of a 21st Century Army.[360] All these efforts took place simultaneously with the drawdown of more than 300 thousand personnel, a budget reduction of approximately 30 percent, and an increase in operational deployments of 300 percent.[361]

Despite these successes, as Sullivan approached his last year as CSA. he understood he needed to embed the hard-fought results into the Army. Sullivan's statements to this point had been vague descriptions of the future and lessons learned from experiments.[362] As a senior aide pointed out, the Howze board led to innovations in air mobility because senior leaders quickly implemented experimental findings within the Army.[363] For Sullivan's theory of victory to continue to become a reality, he needed a new mechanism to instantiate the evolving ideas concerning a force projection Army in the information age. This mechanism was the Force XXI campaign.

Sullivan took three actions to consolidate the gains of Louisiana Maneuvers and establish an organizational framework for continued experimentation after his departure. First, Sullivan tasked the LAM Task Force to design a campaign that would transition the

---

[360] The Louisiana Maneuvers facilitated partnerships with RAND and Lincoln Labs which led to the Army experimenting with different space-based communications packages. This knowledge helped the Army Space and Strategic Defense Command provide a commercial prototype to contingency forces deployed in Somalia, see Yarrison, *The Modern Louisiana Maneuvers*, vii; At the Army staff level, the 1993 GHQx exercise identified challenges with meeting the demands of a force projection Army, see Lieutenant Colonel John C. Dibert, "General Headquarters Insights," *Military Review* 77, no. 2 (April 1997): 61–67.

[361] Personnel levels and budget levels derived from comparing Fiscal Year 1991 and 1993 in the Appendix of Sullivan, *The Collected Works of the Thirty-Second Chief of Staff,* 451-456; General Sullivan cited the increase in operational deployments starting with the fall of the Berlin Wall in his speech to the 1994 Annual AUSA Convention, 18 October 1994, in Sullivan, *The Collected Works of the Thirty-Second Chief of Staff,* 305.

[362] COL(R) Michael Harper, interview by Ryan Kendall, December 8, 2021.

[363] BG Harold Nelson highlighted the historical example of the Howze Board experiments, a series of air mobility experiments overseen by General Hamilton Howze in 1962. The experiments and associated results served as the foundation for the 11th Air Assault Division which conducted further experiments, resulting in operational units which served in the Vietnam War. Nelson advised Sullivan, "The Howze Board findings on mobility would have been lost if there had been no 11th Air Assault Division to make the helicopter the technological basis for new doctrinal and organizational concepts. BG Harold Nelson, "Louisiana Maneuvers: Seeing the Elephant," June 18, 1993, BG(R) Harold Nelson Personal Papers.

early theoretical work of the Louisiana Maneuvers into practice and present it for approval to the BoD. Announcing the campaign in March 1994, Sullivan stated: "It is time to redesign the force to better leverage both the power of our people and the power of our technology."[364] Force XXI would utilize experimentation to reconceptualize and redesign the Army from the foxhole to the industrial base.[365]

The Force XXI campaign was a simultaneous, interactive process that included three focus areas: reforming the Army's Title 10 processes, led by the Vice Chief of Staff, General Tilelli; redesigning the Operating Army through an effort known as Joint Venture, led by the TRADOC Commander; and reforming the acquisition process, led by the Army Digitization Office. The senior leaders in each area had familiarity with the New Louisiana Maneuvers and served as the continuity between early experiments of the New Louisiana Maneuvers and the new initiative.[366] Similar to the DESERT HAMMER experiment, Force XXI promised to provide a physical manifestation, what Sullivan referred to as a Grecian Urn, around which the Army could create new knowledge, build advocacy for future modernization, and most importantly build consensus within a new Force XXI community of practice.

The campaign's main effort, Joint Venture, integrated a series of digitization experiments leading up to two Advanced Warfighting Experiments (AWEs), including a brigade-level rotation at the National Training Center in Fort Irwin, California, in March 1997, followed by a division exercise at Fort Hood in August 1997. Additionally, a new series of meetings as part of the corporate process included senior Colonels, helping to generate debate and ideas at an echelon lower than the corporate process of the Louisiana Maneuvers.

---

364 Sullivan, *The Collected Works of the Thirty-Second Chief of Staff,* 318.
365 Ibid., 318.
366 Louisiana Maneuvers Task Force, "Louisiana Maneuvers Task Force in Transition," September 29, 1994, Louisiana Maneuvers Collection, TRADOC Military History and Heritage Office.

The BoD approved the Force XXI campaign in July 1994 and designated the soon-to-be 4th Infantry Division (4th ID) at Fort Hood, Texas, as the Experimental Force (EXFOR).

Second, Sullivan relocated the bulk of the LAM Task Force to Crystal City, Virginia, to facilitate greater coordination with the Army staff. The LAM Task Force would integrate the Force XXI campaign, but its future would be left for General Reimer to decide. Finally, in June 1994, Secretary of the Army Togo West and General Sullivan announced the Digital Standing Task Force had become the Army Digitization Office (ADO), charged with overseeing the Army's acquisition and programmatic efforts associated with digitization. The ADO represented the increasing social consensus among senior leaders regarding digitization and was a critical piece of Sullivan's plan to bring his theory of victory to fruition.[367]

***Continuity in Senior Leader Sponsorship***

On June 20, 1995, General Dennis Reimer took over from General Sullivan as the Chief of Staff of the Army. Reimer, who served as the Vice Chief of Staff during the beginning of General Sullivan's tenure and previously served as the FORSCOM commander, provided continuity in senior leader sponsorship for experimentation. Reimer faced significant issues within the Army that could easily have captured his attention and drawn him away from the hard-fought experimentation efforts of the Louisiana Maneuvers and the newly minted Force XXI campaign. High operational tempo, challenges to readiness, and budget shortfalls characterized the policy environment for the Army when General Reimer entered the position in 1995. By 1996, operations in Bosnia and the sexual assault scandal at Aberdeen Proving Grounds, Maryland, all placed significant demands on his time and focus.

[367] Yarrison, *The Modern Louisiana Maneuvers*, 42.

However, Reimer remained a champion for the Force XXI campaign through all these instances.

***Task Force XXI Advanced Warfighting Experiments (1996-1997)***

The Brigade Task Force AWE at the National Training Center and the Division AWE at Fort Hood, Texas, in 1997 marked a significant increase in size and scope compared with the experiments during the Louisiana Maneuvers. For example, during the Brigade Task Force AWE, the EXFOR included 5,000 personnel who received over 7,000 individual pieces of equipment with more than 900 vehicles modified into over 180 different configurations. In addition, more than 1,200 contractors from 48 different companies supported the experiment.[368] In addition to representatives for each system, the EXFOR required assistance from Federally Funded Research and Development Corporations (FFRDCs), such as MITRE, to design the systems architecture for the tactical internet. Additionally, contractors embedded at different command echelons within the EXFOR assisted in the real-time collection and editing of emerging doctrine and digital tactics, techniques, and procedures throughout the train-up and AWE to be used by subsequent Army units. The Division also deployed dedicated contractor support teams in direct support of Brigade Task Force units to maximize the readiness of the experimental systems.[369]

Senior leader sponsorship proved critical during the Force XXI experiments. Disparate organizations and their associated interests accompanied the experiments as they increased in scale and scope. Senior leaders could not conduct the experimentation themselves, and the practitioners responsible for experimentation could not do it without

[368] Mark Hanna, "Task Force XXI: The Army's Digital Experiment," *Institute for National Strategic Studies*, no. 119 (July 1, 1997), https://doi.org/10.21236/ADA385995.
[369] BG(R) Thomas Goedkoop, interview by Ryan Kendall, January 6, 2022.

the consistent, unflinching support of the senior leaders. One of the leaders of the AWE effort at Fort Hood described the impact of this sponsorship:

> General Reimer came in and we had three four stars that carried this thing. General Bramlett was at FORSCOM, General Bill Hartzog was at TRADOC, and of course, General Reimer. The fact that the three of them were absolutely lockstep gave us a runway that we would have never had.[370]

This sponsorship was significant for two reasons. First, it empowered those in charge of the AWEs with the freedom to make decisions based on their best judgment and understanding of General Reimer's intent. This level of trust ensured those involved understood their decisions had the CSA's backing. Second, the senior leader sponsorship ensured those leading the experimentation process aligned with the norms, beliefs, and conventions of the emerging Force XXI community of practice. This placed leaders who bought into Force XXI and the theory of victory regarding a 21st Century Army in positions where they could influence the experiments, significantly increasing the chances of success. The following description of these experiments will provide context to examine the impact of these relationships.

Those charged with executing the experiments required the senior leader's sponsorship to align all those involved towards a common purpose.[371] A multitude of groups and organizations from the testing and acquisition community, branch proponents and schools, and the defense industry and contractors played a role in training, equipping, and developing the EXFOR during an intensive preparation period from January through December 1997.[372] These interactions centered around three areas: equipment testing,

---

[370] LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022.

[371] Several interviewees remarked on the frequency of visits by both General Reimer and Hartzog. LTG(R) Swan recalled that Reimer visited NTC more often than any other CSA during his tenure as the OPFOR Commander at NTC, to include riding along with him during the 1997 AWE. LTG(R) Guy Swan, interview by Ryan Kendall, January 20, 2022.

[372] Annette J. Krygiel, *Behind the Wizard's Curtain: An Integration Environment for a System of Systems*, CCRP Publication Series (Washington, D.C.: National Defense University, 1999), 75.

integration, and fielding, led by General Bill Campbell and Colonel Steve Boutelle; training and force design led by the EXFOR Division commander, General Paul Kern and Brigade Task Force commander, Colonel Tom Goedkoop; and integration of the overall experimentation effort, led by the Director of the EXFOR Coordination Cell (ECC), Colonel Thomas Metz. Activities in each of these areas would affect the others, requiring a significant amount of coordination between the leaders of each area. The work was intensive and required many involved to conduct 24-hour operations.[373] The leaders had a shared belief in the experimentation process and, over time, developed incentives to engender the same belief in the different groups required to perform the experiments. This shared belief, combined with the senior leaders' support, enabled leaders to align the variety of interests involved with the AWEs successfully.

The example set by senior leader sponsorship set conditions for leaders to grow social consensus from the bottom up. Emulating the trust that senior leaders such as Generals Reimer and Hartzog had given them, those leading the preparation for the experiments empowered junior soldiers and officers in the EXFOR to take ownership of the process. Front line users of the equipment played a critical role in the iterative development of initiatives, providing feedback to the engineers and industry representatives and exploring new employment methods. The Central Training and Support Facility (CTSF) became the meeting place for users, developers, and industry representatives. A spiral development process emerged where engineers iterated based on feedback from soldiers, shortening iterative development times, building social consensus amongst stakeholders involved in the experimentation process, and increasing the knowledge base amongst the EXFOR. This

[373] Ibid., 75.

user-focused approach engendered a sense of ownership and teamwork amongst the different groups and the belief in the potential of digitization.[374]

EXFOR leaders reinforced this sense of ownership and over time fostered a social identity around experimentation. Those in the experimental force latched onto their role as designers of the future army. The Task Force XXI brigade commander described how those within the organization viewed their role: "It was leading the Army into the 21st Century. Everyone wanted to have their fingerprints on it."[375] Soldiers and officers became the spokespersons for the Division, interacting with the media and defense policy leaders, further developing support internal and external to the EXFOR.[376] Leaders emphasized the uniqueness and importance of the mission through the use of unit monikers and language. In the buildup to the Division AWE, the 4th ID commander, General Scott Wallace, worked to give the division an identity unique to this experience:

> I tried … to give the division an identity not as the 4th ID that went across the beaches in Normandy, but the 4th ID which was Force XXI, forging the future for the United States Army… to capture the imagination of soldiers and keep telling them they're special. You're special; you're playing with technology that nobody else in the world has. And you're playing with that technology because this division has been so collected to determine whether it's good or bad and how to use it.[377]

An important part of this consensus building effort came from the EXFOR's Senior Non-Commissioned Officers (NCOs). The Brigade Command Sergeant Major (CSM), CSM Henry Vance, and Operations Sergeant Major (SGM), SGM Mike Womer, played a pivotal

---

[374] Several interviewees discussed the CTSF's value as an integration tool. The CTSF served as a meeting place for key stakeholders. It was both functionally and socially impactful. Work at the CTSF created consensus on issues that required the interaction of multiple groups. As a functional driver of innovation, it brought together all the stakeholders required to increase the frequency of development. As a social driver, it helped to break down barriers and align interests amongst a variety of groups. Al Grasso, interview by Ryan Kendall, January 11, 2022; LTG(R) William Campbell, interview by Ryan Kendall, January 14, 2022; LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022; GEN(R) Paul Kern, interview by Ryan Kendall, January 21, 2022.
[375] BG(R) Thomas Goedkoop, interview by Ryan Kendall, January 6, 2022.
[376] GEN(R) Paul Kern, interview by Ryan Kendall, January 21, 2022.
[377] GEN(R) Scott Wallace, interview by Ryan Kendall, August 27, 2021.

role in supporting what the senior leadership was trying to do. The Senior NCOs were the front-line leaders who would carry out the necessary tasks for experimentation. Womer led an effort to convince the Senior NCOs that the new digital platforms would not create an additional burden, such as having to manually input information from one digital platform into another. It would be an integrated platform, and they would have time to continue to train soldiers on their basic skills. As Womer stated, "As a result, the NCOs bought it hook, line, and sinker. We reinforced basic soldier skills and we made soldier training for these new systems important." The Senior NCOs moved from compliance to advocacy, working with soldiers to develop "User Juries" where programmers received feedback from soldiers after training exercises. Womer recalled, "My goal was to make every soldier in the brigade to know they are at the beginning of a transformative period in our military's history."[378]

The consensus building and empowerment of EXFOR soldiers also helped develop consensus external to the experiments. Rather than hearing from senior leaders about the different experimental initiatives, those using the equipment or new doctrine provided the most credible accounts. For example, Secretary William Perry visited the EXFOR at Fort Hood on two different occasions. The first time he was not very impressed by what he saw. However, during a later visit, Perry interacted with soldiers who had been training and experimenting with digitized technologies. General Paul Kern remembered Secretary Perry's visit: "He grilled those people pretty hard. The part to me, which was both rewarding, and I think the telling part of it, was that soldiers could explain to him both the technical and the operational value of what they were doing. That made a big difference."[379]

---

[378] SGM(R) Michael Womer, interview by Ryan Kendall, January 28, 2022.
[379] GEN(R) Paul Kern, interview by Ryan Kendall, January 21, 2022.

### *An Emphasis on Credibility*

Senior leaders understood that people had to view the experiments as credible for the digitization experiments to build consensus and extend advocacy throughout the defense policy subsystem. Towards the end of the Louisiana Maneuvers experiments, Sullivan reflected on the connection of credibility, consensus, and advocacy:

> By 1994, I had become experienced enough to know [that] much of what was being touted as an experiment was in reality a demonstration, rather than a reasonably controlled scientific experiment capable of withstanding scrutiny on Capitol Hill and a close look within DoD. Thus, the requirement for up-front hypotheses and [Methods of Effectiveness], and the involvement of [Operational Test and Evaluation Command] and Army Audit Agency in the process.[380]

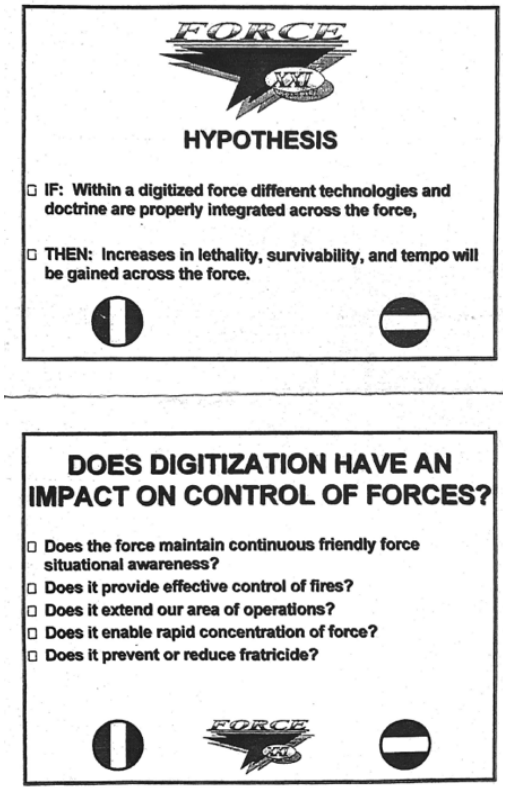
The understanding of this connection did not end with Sullivan. General Hartzog centered the Force XXI AWEs around a central hypothesis regarding the integration of digital technologies and their impact on lethality, survivability, and tempo. National Training Center Observer/Controllers, experimental technology evaluators and AWE participants used the hypotheses and a set of related questions to orient discussion surrounding the different experimental technologies and Warfighting concepts (see Figure 3.4 below). The emphasis by senior leaders on these questions focused analysis efforts and encouraged EXFOR leaders and soldiers to think about how the different initiatives increased their effectiveness and that of their unit.[381]

---

[380] Yarrison, *The Modern Louisiana Maneuvers*, 52.

[381] GEN(R) Scott Wallace, interview by Ryan Kendall, August 27, 2021; BG(R) Thomas Goedkoop, interview by Ryan Kendall, January 6, 2022.

Figure 3.3: Excerpt from a TRADOC "Brown Card" carried by EXFOR members and evaluators.




The emphasis on credibility extended to all facets of the Brigade AWE. NTC provided a heavily instrumented battlefield simulation, with a thinking enemy, and professional observers. Previous NTC rotations, to include that of the EXFORs sister unit, served as comparison groups for analysis.[382] The Opposing Force (OPFOR) was given the same latitude as during other rotations, even changing their tactics during the experiment in response to EXFOR capabilities.[383] Additionally, the NTC leadership went to great lengths to ensure the Experimental Force felt like any other unit on a training rotation by keeping the slew of media and VIPs away from the units. Instead of bringing visitors out to the field,

[382] Colonel Thomas R. Goedkoop and Captain Barry E. Venable, "Task Force XXI: An Overview," *Military Review* 77, no. 2 (April 1997): 72.
[383] LTG(R) Guy Swan, interview by Ryan Kendall, January 20, 2022.

experiment organizers provided daily battle update briefings at Fort Irwin to interested organizations and media.[384]

### C.5 Extending the network: Building advocacy for Force XXI

Through the AWEs, Reimer and other senior leaders extended the advocacy network in both size and strength. Similar to the integrated messaging of the Louisiana Maneuvers, Reimer used coordinated internal and external communications to build consensus and extend the advocacy network. In addition, the AWEs provided ample opportunities to demonstrate the value of experimentation, and more importantly, the potential of a digitized force. Rather than computer simulations and small units, the AWEs increased experimentation in both size and scope, creating excitement about the future of the Army through the stories of its soldiers.

AUSA remained a stalwart messaging platform for the Army, becoming even more effective at communicating the Army's ideas after newly retired General Sullivan took over as President. Sullivan oversaw a significant increase in AUSA membership and the opening of new regional chapters around the US. AUSA maintained a consistent number of events and regularly featured the Force XXI efforts. Those who had been part of the AWEs found themselves discussing the merits of the experiments and what they had learned about digitization.[385] Additionally, articles in the AUSA Green Book emphasized the importance of experimentation and the digitized force.

The AWEs also presented opportunities for interactions with media. Reimer valued these interactions and felt it was important for the Army to let soldiers tell its story. For example, General Reimer invited *Army Times* journalist Sean Naylor to embed with the AWE

[384] BG(R) Thomas Goedkoop, interview by Ryan Kendall, January 6, 2022; Interview with GEN(R) Scott Wallace, interview by Ryan Kendall, August 27, 2021.
[385] COL(R) James Harris, interview by Ryan Kendall, December 22, 2021.

Brigade Task Force during its training at Fort Hood and at NTC.[386] Naylor captured key successes from the preparation stage and early lessons learned from the NTC experiment, helping to increase the impact of the experimentation efforts to the *Army Times* audience, which consisted primarily of Army soldiers and retirees.[387] In addition, EXFOR units utilized Public Affairs Officers to help manage different national media engagements and write stories for local media around Fort Hood.[388] National media engagements generated articles in outlets such as the *Washington Post* and *LA Times*, further increasing the reach of the Army's experiments.[389]

Outside of the media, the experiments helped build advocacy with allies and partners. For some, seeing the experiments was very impactful. For example, one group of German officers was particularly impressed by what they saw at NTC, stating, "This is as important as invention of armor on the battlefield."[390] While not all responses from allies might have been as glowing, the experiments served as a way to feature emerging US thinking and technologies and share ideas with allied militaries.

Finally, the AWEs extended the advocacy network with Congressional members. Following the Brigade AWE, senior Army staff members tasked Colonel Boutelle and Colonel Metz with discussing their experiences during the AWE with members of the Senate. While it was not clear whether the senators wanted to talk with Metz and Boutelle to

---

386 BG(R) Thomas Goedkoop, interview by Ryan Kendall, January 6, 2022.

387 Sean Naylor, "Digitized Brigade Struts Its Stuff in First Action," *Army Times*, January 13, 1997.

388 Colonel Goedkoop requested a Public Affairs Officer for his EXFOR brigade despite the fact Public Affairs Officers were not allocated at the Brigade level. His request demonstrates how important media engagement was for the experimental units, BG(R) Thomas Goedkoop, interview by Ryan Kendall, January 6, 2022.

389 Bradley Graham, "Army Trying Out Electrons to See If It Can Get Smaller and Faster," *Washington Post*, March 31, 1997; Paul Richter, "Army Puts Computer-Based Technology to Battlefield Test," *LA Times*, March 31, 1997.

390 LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022.

validate other claims the Army had made or if there was another motive, the briefing was well received and appeared to satisfy the senators.[391]

## D. EXPERIMENTATION OUTPUTS

Sullivan and Reimer used experimentation and a corporate process to build consensus and extend his advocacy network, successfully generating the seed corn of mid-grade and junior leaders who would comprise a new community of practice and the advocacy network required to transition to implementation. By 1999, the Force XXI experiments successfully developed a prototype division, complete with one brigade equipped with applique technologies, new sustainment organizations, and improved intelligence capabilities.[392] Similar to the 11th Air Assault Division prior to Vietnam, the knowledge generated during the AWEs enabled Army leaders to rapidly scale up the prototype within lead units preparing for the US invasion of Iraq in 2003.[393]

### D.1 Social Consensus

The 1997 Brigade and Division AWEs generated new knowledge and helped form a consensus around digitization. In addition, the AWEs had provided the opportunity for those participating and senior leaders observing to recognize the benefit of digitization and to imagine its future possibilities. General Reimer summarized this perspective following the AWEs in his October 1997 AUSA speech:

> The experiment [Brigade AWE] achieved its objective, providing a realistic opportunity to test how our soldiers and available technology can move us toward the next generation of military forces. The AWE provided everyone, from the soldiers in the experimental Brigade Combat Team to Army senior leaders, proof of

391 LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022.

392 Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005*, 183.

393 LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022; LTG(R) William Campbell, interview by Ryan Kendall, January 14, 2022.

> the increased lethality and force effectiveness brought about by improved situation awareness.[394]

Further evidence can be found outside of those who experienced or observed the experiments. Although the EXFOR comprised roughly 1/10 of the active-duty Army, evidence that Force XXI ideas had taken hold outside of the experiments appeared in the form of articles in professional journals, such as branch publications and *Military Review*. Similar to previous publications, senior and mid-grade officers explored different aspects of digitization, from the impacts on leadership to the increasing role of command and control systems in warfare. These articles included lessons learned from the Force XXI experiments and the value of digitized formations compared with legacy formations.[395] Additionally, Force XXI and digitization remained a central topic at AUSA events. Following the AWEs, leaders who participated in the AWEs spoke at AUSA events, sharing their experiences and vouching for the advantages of digitization.[396]

Within the senior leadership, the momentum of Force XXI AWEs sparked an interest in developing an increased understanding of digitization and information technologies. Shortly after the AWEs, the Combined Arms Center commander, LTG Montgomery Meigs, requested a one-on-one class with Colonel Steve Boutelle to educate him on the technical theories and components that made digitization work. After Boutelle met with General Meigs, word quickly got out to other senior leaders. As a result, Boutelle

---

[394] Dennis J Reimer, *Soldiers Are Our Credentials: The Collected Works and Selected Papers of the Thirty-Third Chief of Staff United States Army*, ed. LTC James Jay Carafano (Fort McNair, VA: Center for Military History, 2000), 151.
[395] A review of yearly indexes for *Military Review* and *Parameters* from 1996-1999 identified a consistent stream of published articles which examined the implications of digitization. *Military Review* examples include MAJ Mark C. Malham and Debora Gabbard, "Battle Command Systems: The Force XXI Warfighter's Advantage," *Military Review*, February 1998; MAJ Jack Gumbert, "Leadership in the Digitized Force," *Military Review*, no. 33 (April 1998); COL John J. Twohig, MAJ Thomas J. Stokowski, and MAJ Bienvenido Rivera, "Structuring Division XXI," *Military Review*, June 1998. COL(R) Jim Harris served as the dismounted infantry battalion commander for Task Force XXI and then conducted a rotation at the Joint National Training Center after the AWE as a legacy organization, affording the opportunity for him to compare the two organizations. See LTC James E. Harris III, "To Fight Digitized or Analog," *Military Review* 89, no. 6 (Nov-Dec 99): 12–17.
[396] COL(R) James Harris, interview by Ryan Kendall, December 22, 2021.

developed a course with the support of MITRE that became popular with senior leaders lacking the technical background to understand digitization, eventually becoming a requirement for senior leaders selected as general officers.[397]

Even with the success of the AWEs and increased support from senior leaders, pockets of resistance remained in different communities regarding the Army's digitization efforts. First, during the 1997 Quadrennial Defense Review (QDR), the Army emphasized the need to maintain readiness to meet the demand of contingency operations, such as Haiti and Bosnia, which had dramatically increased in frequency following the Gulf War. Digitization efforts focused on existing platforms so as to not change so much that it disrupted the Army's ability to perform its missions. By making this argument, the Army opened itself up to criticism by those who felt the Army was moving too slowly by developing appliqué platforms rather than new programs. This policy seemed incremental rather than revolutionary.[398]

Those calling for more radical change included Colonel Douglas McGregor, whose book *Breaking the Phalanx* envisioned a brigade-based force with new organizational designs that utilized long-range artillery, precision weapons, sensors, and information technologies. Reimer noted that voices such as McGregor's "were small in number, but they were loud in terms of their ability to project their thoughts."[399] Rather than dismiss McGregor's ideas, Reimer encouraged senior leaders to read his book and later discussed the ideas with the Army's senior general officers. Regarding controversial ideas, Reimer pointed out, "if you

---

[397] Colonel Boutelle began the course with LTG Meigs and continued to instruct the course for several years with significant support from MITRE until then Chief of Staff of the Army General Schoomaker mandated all general officers and promotable Colonels receive the course, LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022.

[398] Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005*, 168-169.

[399] General (Retired) Dennis J. Reimer, interview by Ryan Kendall, December 21, 2021.

don't really listen to them, you might have missed out on a good idea. But secondly, I think you lose some credibility if you disregard it without listening to what they say."[400]

Second, resistance came from stakeholders upon whom digitization had a negative impact. These groups used their networks to attempt to prevent digitization from taking hold. Several existing command and control platforms required expensive hardware, which needed regular replacement. These acquisition programs had established constituencies, many of whom were retired senior offices. As digitization threatened existing programs whose expensive equipment had become redundant and outdated, those advocating for digitization faced pushback. Boutelle described his experience with these groups: "retired senior leaders…really pressed us hard. And most of those senior leaders have connections on the Hill and there in industry."[401] Boutelle's experience with Force XXI, his credibility as a result of the Force XXI AWEs, and his participation in the advocacy network enabled him to ward off outside pressures and continue to advocate for the new community of practice.[402]

### D.2 Strengthening the Advocacy Network

Experimentation had helped construct belief throughout multiple levels within the Army. However, the previous examples of challenges to consensus outside the Army emphasize the importance of an advocacy network that stretches across the defense policy subsystem. During both the Louisiana Maneuvers and the AWEs, experimentation proved helpful for leaders to extend the advocacy network. Externally to the Army, the support that Sullivan was able to garner provided critical to creating the space and the resources for experimentation. Through his external messaging, AUSA events, active relationship building

[400] General (Retired) Dennis J. Reimer, interview by Ryan Kendall, December 21, 2021.
[401] LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022.
[402] Ibid.

with Congress, and connections with academia and industry, Sullivan created opportunities for access to new ideas and mutually beneficial partnerships, such as with Microsoft and Lincoln Labs. In addition, he solidified support within the Department of Defense and Congress by building consensus across the Army's senior leaders and injecting new thinking to match the demands of the strategic environment.

Reimer continued these efforts, leveraging the Force XXI AWEs to extend the advocacy network deeper into the defense policy network even with the Quadrennial Defense Review and the National Defense Panel.[403] Visits to the AWEs with both Secretaries of Defense Perry and Cohen solidified their support for the Army's digitization efforts. As a former Congressional member, Cohen's support provided credibility within Congress and helped to assuage concerns as the Army prepared to transition to implementation.[404] Further evidence of the advocacy network extending into the Department of Defense comes from John Hamre, former Deputy Secretary of Defense, who visited the AWEs:

> There was a general sense in OSD that the Army was stuck and needed new thinking. These were very difficult days from a budget standpoint. The Army had made defending its force structure as its transcending budget objective in deliberations with OSD... So both [Louisiana Maneuvers and Force XXI] were seen as welcome steps to bring in some fresh ideas and break out of the rigid thinking at the time.[405]

---

[403] The National Defense Panel used the Army's experimentation process as an example for the other services and as a template for the Joint force. However, the Panel's report emphasized moving faster on modernization initiatives rather than making yesterday's forces better through incremental improvement. Processes such as the QDR and the National Defense Panel took up significant bureaucratic energy both in the process and in the responses after the findings are published. Despite having these efforts in the background, the Army's advocacy network continued to build consensus around its digitization ideas. For General Reimer's summary of the National Defense Panel report see Dennis J Reimer, *Soldiers Are Our Credentials: The Collected Works and Selected Papers of the Thirty-Third Chief of Staff United States Army*, 176-180.

[404] General (Retired) Dennis J. Reimer, interview by Ryan Kendall, December 21, 2021.

[405] John Hamre, interview by Ryan Kendall, January 17, 2022.

In addition to political leadership, the advocacy network grew inside the Army. First, Sullivan's consensus building process culminating with the BoD meetings brought the Army's senior leadership together, solidifying an advocacy network that reduced most bureaucratic opposition to limited individuals and pockets of resistance. Second, the continuation of this process under Reimer also helped maintain the Army's focus and internal support for reforms. Third, the united front of the three four stars combined with the multi-echelon network of empowered leaders significantly impacted the success of the experiments.

The multi-layering of the advocacy network through different echelons helped place those who believed in digitization in positions of increasing influence as the Army prepared to transition to implementation. This layering extended the advocacy network deeper across the Army within the key bureaucratic positions where they could positively influence policy decisions. For example, Colonel Boutelle, MG Campbell, and MG Kern all served in key acquisition positions playing a pivotal role in budgetary battles associated with implementation. Their firsthand knowledge of the Force XXI initiatives and belief in their utility caused them to work towards implementing the innovations during the rest of their career and after they left the Army.[406]

The advocacy network began to establish footholds with Allies and sister services, albeit with varying degrees of success. Air Force involvement in the AWEs with JSTARs aircraft and F16s helped expose senior Air Force acquisition personnel to Army command and control initiatives.[407] Allied participation in the experiments associated with the Louisiana Maneuvers and the AWEs introduced allies, such as the British and German armies, to digital capabilities. While they may not have had the budgetary freedom to

[406] LTG(R) Steve Boutelle, interview by Ryan Kendall, January 5, 2022; LTG(R) William Campbell, interview by Ryan Kendall, January 14, 2022; GEN(R) Paul Kern, interview by Ryan Kendall, January 21, 2022.
[407] GEN(R) Paul Kern, interview by Ryan Kendall, January 21, 2022.

implement the digitization technologies, observing the experiments facilitated an understanding of how allies would integrate with US forces and what capabilities to include in future modernization programs.[408]

Compared with Sullivan's core advocacy network, by the end of the AWEs, the Army's advocacy network had grown in sufficient size and strength to support the transition to implementation. With the increase in use of personal computers and information technologies, it was not hard for those in the defense policy subsystem to envision their benefit in military organizations. However, creating a tactical internet that could exchange data was not a trivial undertaking and one that came with significant risk. The increased size and strength of the advocacy network created advocates in depth and breadth across the defense policy subsystem, setting conditions for the pitched bureaucratic battles associated with implementation.

### D.3 New Communities of Practice

The AWEs, combined with the previous digitization experiments and the creation of the Army Digitization Office, created a new community of practice centered on the digitization of Army organizations. The AWEs established a new standard for military experimentation, creating a new generation of Army leaders who experienced a very different way of problem-solving. The AWE experience introduced those involved to the benefits of iterative development, experimentation at NTC, and the potential of digitization across multiple military functions. While the new Force XXI community of practice had many of the same norms and beliefs as other communities, it also introduced a new kind of warfare with a very different social logic due to the impact of the information technologies.

[408] LTG(R) William Campbell, interview by Ryan Kendall, January 14, 2022; General (Retired) Dennis J. Reimer, interview by Ryan Kendall, December 21, 2021.

The Louisiana Maneuvers and the AWEs had demonstrated the value of experimentation, to the point where General Reimer made a series of AWE's the cornerstone of future Army modernization efforts.[409] The new experimentation infrastructure, including the TRADOC Battle Labs and the Synthetic Theater of War, and the integration of experimentation at the Combat Training Centers, provided the necessary environment and tools for future experimentation efforts.[410]

## III. Conclusions

The above analysis of the New Louisiana Maneuvers and the Advanced Warfighting Experiments demonstrates how experimentation is a social process within which leaders build consensus around a theory of victory. Senior leader consensus formed the backbone of these experimentation efforts because it was constructed into the decision-making process. In most cases, senior leaders acknowledged that a BoD decision represented one voice for the Army leadership, and therefore kept their organizations and associated personnel in alignment. This alignment supported the comprehensive communications plan integrated into both series of experiments, helping to both create excitement and inform leaders throughout the policy subsystem how the Army was changing.

Senior sponsorship proved to be necessary but not sufficient. Throughout this case, it is evident that even though a senior leader wants to experiment to change the organization, they cannot do it alone. The limit on a senior leader's power is a function of organizational structures, such as the diffused power among the Army four stars and the roles and responsibilities of Service chiefs as established by the Goldwater-Nichols act. Additionally,

---

[409] Brown, *Kevlar Legions: The Transformation of the US Army, 1989-2005*, 169.

[410] The Synthetic Theater of War was a simulations project that grew out of the New Louisiana Maneuvers. It provided a distributed simulations capability for the Army which became the blueprint for future Joint simulation experiments.

the senior leaders needed an advocacy network that extended down into the Army to ensure that leaders at the lower echelons believed in the new ideas and the experimentation process to produce the credible results required to garner sufficient support within the defense policy subsystem. Furthermore, the advocacy network had to extend up and out through the defense policy subsystem to provide the decision space and resources required for experimentation.

As the advocacy network increased in size and strength, the probability of moving from experimentation to implementation increased. Sullivan and Reimer personally built connections within the defense policy subsystem while marshaling support from external organizations, such as AUSA, and groups such as those in industry to create new connections, diffuse ideas, and build momentum. These experimentation efforts took place in a policy environment characterized by contingency operations, drawdowns, and the domestic demands for a peace dividend. The proactive and organized efforts to obtain buy-in from organizations, groups, and actors that would influence both experimentation and implementation helped the senior leadership weather these demands while simultaneously driving change. The emphasis on conducting credible experiments sufficiently satisfied concerns within Congress and the DoD and allowed the Army to continue developing and experimenting with its prototype force.

In addition to providing an example of how senior leader sponsorship and an advocacy network can increase the probability of transitioning to implementation, this case highlighted some additional policy implications. First, the EXFOR example points out a key difference between experimentation and training within military organizations. Leaders in the EXFOR capitalized on the excitement and opportunity that experimentation presented. However, as time went on, it became apparent that in addition to fostering a social identity around experimentation, it required a different kind of social logic. How units defined

success had changed. The Corps commander, General Schwartz, reflected on the challenges of experimentation:

> Experimentation is shrouded in failure. You fail a lot…you have to teach contractors and soldiers to accept failure, not embrace it. This is junk, this doesn't work. You have to get over that hurdle.[411]

EXFOR leaders defined success differently than they had in traditional combat units. Winning was no longer seizing an objective or destroying the enemy. Instead, winning was providing the Army an honest assessment of its ideas, concepts, and associated technology. This difference in mentality was not limited to the EXFOR. The observers and evaluators involved had to both understand this distinct difference and employ its nuances. Rather than critiquing units on their ability to perform a task, evaluators had to help parse what different aspects of a concept or technology worked. This difference is important because it is so distinct from how most military organizations operate. Similar to March's exploitation and exploration concepts, the difference between improving old routines and developing new ones is significant. Each category requires a distinct set of rules, expectations, and cognitive models.

The difference in desired outcomes implies that experimentation activities require leaders who can clearly define success differently and a group of people who will accept this definition. Individuals who have spent their professional lives working under one definition of success usually struggle with this new model. For example, within the EXFOR, a handful of senior Non-commissioned officers who for years had trained and perfected their skills as tank crewmen struggled with the idea of experimenting with new technologies. These individuals pushed back rather than being open to new ideas and the opportunity to explore

[411] GEN(R) Thomas A. Schwartz, interview by Ryan Kendall, August 18, 2021.

new methods. Since these individuals hold social power within an organization, their lack of belief in the process can prevent consensus from taking hold.[412]

Even though experimentation has a different definition of success, those responsible may feel pressure to describe experimental results in the traditional language of success. In the case of the AWEs, Goedkoop recalled that he did not feel pressure to defeat the OPFOR. However, it is easy to imagine a time when this would not have been the case. Senior leaders invest their credibility and resources into experimentation. The pressure to show that a theory of victory is the right path could tempt those involved to focus on the wrong definition of success, prioritizing winning as defeating the enemy, for example, rather than knowledge construction. Failure under usual standards is often success in experimentation, a paradox that does not breed consensus or facilitate extending an advocacy network. Therefore, senior leaders must clearly define success in experimentation and create the space for those involved to understand that winning has a different meaning within experimentation.

Schwartz, Kern, and Goedkoop overcame the challenges associated with experimentation by building a shared identity around the experimentation process, empowering leaders throughout the organization to make decisions and develop new ideas, and demonstrating a high tolerance for risk. Sullivan and Reimer applied the same approach, but at the organizational level. Sullivan used the New Louisiana Maneuvers in conjunction with his vision to create a new narrative that helped build a shared identity around developing the Army of the 21st Century. Reimer built on Sullivan's efforts with the Force XXI AWEs, using the initiatives developed through the Louisiana Maneuvers to demonstrate the credibility of his claims. Through the New Louisiana Maneuvers and Force XXI Campaign, Sullivan and Reimer empowered leaders at echelons below the Army's

[412] GEN(R) Thomas A. Schwartz, interview by Ryan Kendall, August 18, 2021.

senior leaders to provide new ideas and then explore them through experimentation. Each demonstrated a high tolerance for risk through their personal commitments to experimentation and learning. With so many competing priorities, it would have been easy for them both to orient the Army on a course that ensured it was a smaller version of the Cold War Army. Instead, they committed their legacies to changing the Army without any guarantees of success. The combination of these efforts helped shift the organizational focus to learning and growth within the context of experimentation, rather than the usual metrics associated with getting better at existing routines.

# CHAPTER FOUR: JOINT EXPERIMENTATION AND MILLENNIUM CHALLENGE 2002: SPONSORSHIP AND A STRONG ADVOCACY NETWORK

> Power is increasingly defined, not by mass or size, but by mobility and swiftness. Influence is measured in information, safety is gained in stealth, and force is projected on the long arc of precision-guided weapons. This revolution perfectly matches the strengths of our country – the skill of our people and the superiority of our technology. The best way to keep the peace is to redefine war on our terms.
>
> Governor George W. Bush[413]

## I. Introduction

Joint Forces Command's joint experimentation of the late 1990s and early 2000s, culminating with Millennium Challenge 2002, serves as a deviant case where experimentation began with an initially strong advocacy network but failed to transition the innovation to the implementation stage. Congressionally mandated joint experimentation to explore emerging military capabilities, known as the Revolution of Military Affairs (RMA), coincided with Donald Rumsfeld's return as Secretary of Defense and his defense transformation initiatives. An ideological competition developed between RMA-Optimists and RMA-Skeptics centered on Rumsfeld's reform efforts. These events set the stage for Millennium Challenge 2002, the largest US joint experiment in history involving more than 13,500 personnel and costing more than $250 million, focused on a joint integrating concept, Rapid Decisive Operations. While JFCOM's experimentation initially benefited from a strong advocacy network, a respected retired General officer alleged the experiment was rigged to produce outcomes that favored Rumsfeld's reforms. His public comments created an enduring counter-narrative that significantly restrained momentum for reform, degraded support from key entities such as Congress, and supported those RMA-Skeptics belief that advanced

[413] Governor George W. Bush, "A Period of Consequences, Speech at the Citadel," September 23, 1999, http://www3.citadel.edu/pao/addresses/pres_bush.html.

technologies could not subjugate war's uncertainty and chance. This ideological struggle continues today to the detriment of finding a solution.

This chapter examines this deviant case using the peacetime military experimentation framework to understand how the structures and incentives of joint experimentation impact the causal mechanism and the presence of potential alternative explanations. The following sub-section provides a background of the case study and summarizes the causal mechanism and its associated context. The second section examines the experimentation framework focusing on the interactions of senior leader sponsorship from Congress and the Department of Defense, the social processes of JFCOM's experimentation activities and their combined effects on advocacy network development. The final section discusses the associated findings and conclusions.

## BACKGROUND

The US-led victory in the Gulf War and the multiple contingency operations in the early post-Cold War era ushered in a rapidly changing strategic environment. Many saw the Gulf War as a validation of post-Vietnam military reforms. However, others saw it as a glimpse of future warfare, a so-called Revolution in Military Affairs (RMA), that could extend US military dominance or potentially be used by potential adversaries against the US. A new theory of victory emerged, *Joint Vision 2010,* that combined long-range precision weapons, low observable technologies, and information technologies to achieve an order of magnitude improvement in lethality that would extend US military superiority.[414]

As the defense policy subsystem entered into an ideological competition over how to fight future wars, Congress became increasingly frustrated by the perceived gap between the

[414] GEN John M. Shalikashvili, "Joint Vision 2010" (Office of the Chairman of the Joint Chiefs of Staff, July 1996), https://www.airforcemag.com/PDF/DocumentFile/Documents/2005/jv_2010_071696.pdf.

US military and the evolving security environment. Continency operations, such as Somalia and Kosovo, emphasized the challenges with force projection. Defense reform efforts had thus far failed to meet the intent of the Goldwater Nichols Act for increased joint capabilities. In response, Congress instituted a series of mandates to speed defense transformation, including establishing a combatant command to oversee joint experimentation.[415]

Joint Forces Command (JFCOM) stood up in 1999 and established its joint experimentation and concept development process to further develop ideas in *Joint Vision 2010*, conducting two separate experiments by 2000.[416] These processes produced a joint concept known as Rapid Decisive Operations (RDO) that integrated new command and control and planning concepts to assault an adversary asymmetrically, using military capabilities and other instruments of national power, "to preclude the opponent's options and seize the operational and strategic initiative."[417] JFCOM used the experimentation and concept development processes to successfully extend and reinforce its advocacy network across the policy subsystem. As the Bush administration took office, the momentum for defense transformation continued to build and combined with the Congressional mandate for a joint field experiment in 2002 to create significant pressure for JFCOM to produce.

Rather than redirect Rumsfeld's transformation plan, the attacks on 9/11 and the invasion of Afghanistan made Rumsfeld place more emphasis on transformation, citing the

---

[415] See the following for more details on these initiatives, "National Defense Authorization Act for Fiscal Year 1997," Pub. L. No. 104–201, § 923-924 (1996); "Strom Thurmond National Defense Authorization Act for Fiscal Year 1999," Pub. L. No. 105–261, § 921 (1998); John Warner, "Press Release: Senate and House Complete Conference on National Defense Authorization Bill for Fiscal Year 2001," October 6, 2000.
[416] Edward J. Drea et al., *History of the Unified Command Plan 1946-2012* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 2013), 77.
[417] BG Gordon C. Nash, "Pamphlet for Future Joint Operations" (United States Joint Forces Command, March 1, 2002), 7.

need to make necessary reforms before it was too late.[418] Despite an unrivaled military capability, Rumsfeld and other defense policy leaders believed there was a limited strategic window to transform the military and sustain its superiority. Joint experimentation expanded from Congress's joint integration emphasis to become part of Rumsfeld's broader transformation efforts. As Millennium Challenge 2002 approached execution, expectations began to build as senior leaders, including Secretary Rumsfeld, advocated for the experiment and what it might produce. The combined pressures of Congress and senior defense leaders and the need to account for Service equities drove JFCOM planners to design the largest joint experiment in US history. Millennium Challenge 2002 (MC 2002) involved more than 13,500 personnel in 17 simulation locations and 9 live-fire ranges and cost more than $250 million.[419] The experiment proved to be a series of contradictions as constraints associated with the simultaneous use of live forces and simulations caused JFCOM staff officers to reduce the previously advertised free-play of the Opposing Force (OPFOR) commander, retired Marine Lieutenant General Van Riper.[420]

Shortly after the experiment, the media contacted Van Riper after leaked emails indicated he disagreed with the experiment's execution. Frustrated by what he perceived as attempts to produce a pre-determined outcome, Van Riper used the media to publicly share his concerns, accusing JFCOM of running a rigged experiment with the intent to validate the RDO concept.[421] Van Riper's narrative that senior defense officials were using doctrine and weapons systems based on faulty assumptions became entangled with the political narratives

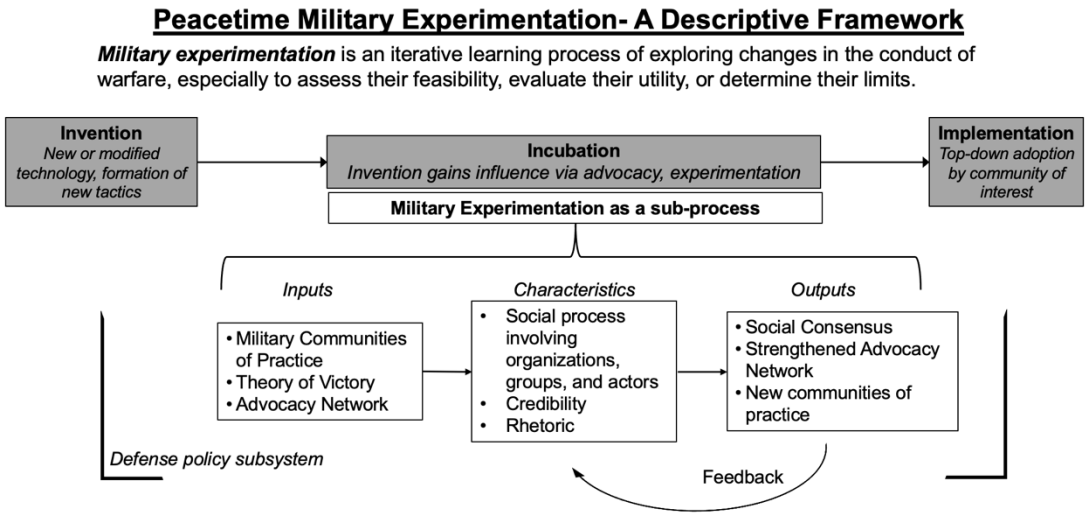
---

[418] The Honorable Donald H. Rumsfeld, "Secretary Rumsfeld Speaks on '21st Century Transformation' of U.S. Armed Forces," January 31, 2002.
[419] "U.S. Joint Forces Command Millennium Challenge 2002: Experiment Report," Experiment Report (Norfolk, VA: U.S. Joint Forces Command, n.d.); Micah Zenko, *Red Team: How to Succeed by Thinking like the Enemy* (New York, NY: Basic Books, 2015), 52.
[420] MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022.
[421] Sean Naylor, "War Games Rigged?," *Army Times*, August 16, 2002.

surrounding transformation and potential future US actions in Iraq.[422] The power of his narrative successfully restrained the building policy momentum, damaged the advocacy network associated with joint experimentation, and prevented the burgeoning RMA-Optimist military community of practice from gaining strength as the ideological battle over future US military power continued into the Iraq war.

## II. Applying the Framework

Figure 4.1: Peacetime Military Experimentation Framework




The following subsections will examine the experimentation process using the peacetime military experimentation framework above (see Figure 4.1). First, an overview of the defense policy subsystem during the late 1990s and early 2000s highlights key external events and internal parameters that shaped the policy subsystem. The following section examines the inputs to the experimentation process leading up to JFCOM's joint

[422] Julian Borger, "When 'Saddam' Won the War. If the US and Iraq Go to War, There Can Only Be One Winner, Can't There? Maybe Not. This Summer, in a Huge Rehearsal of Just Such a Conflict - and with Retired Lieutenant General Paul Van Riper Playing Saddam - the US Lost. Julian Borger Asks the Former Marine How He Did It," *The Irish Times*, September 14, 2002, City Edition, sec. Weekend.

experiments. The third section discusses the characteristics of experimentation, focusing on the concept development, experimentation planning, and execution of Millennium Challenge 2002. The fourth section analyzes the outputs of experimentation. Finally, an ongoing assessment of the causal mechanism and potential alternative causal mechanisms occurs throughout each portion of the process.

## A. DEFENSE POLICY SUBSYSTEM

### A.1 External Events

Two external events significantly impacted the defense policy subsystem leading up to the new millennium. First, US operations during the Gulf War demonstrated a significant increase in military effectiveness due to "the use of stealth aircraft, precision-guided munitions, advanced sensors, and the global positioning system (GPS) constellation of satellites the United States had deployed in the 1980s."[423] Many in the US military saw the Gulf War as a validation of the extensive post-Vietnam era reforms in doctrine, training, and equipment. However, some saw it as evidence of fundamental changes in the character of warfare. Andrew Marshall, the longtime director of the Office of Net Assessment (ONA), saw that these changes could make US military dominance uncertain in the long term. The Soviet analysis also pointed to potential changes in the character of war, concluding "that 'the integration of control, communications, reconnaissance, electronic combat, and delivery of conventional fires into a single whole' had been realized for the first time."[424]

ONA published an assessment of the potential "Military Technical Revolution" coming out of the Gulf War, characterized by "technological change, military systems

[423] Andrew Krepinevich and Barry Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy* (New York, NY: Basic Books, 2015), 216.
[424] This statement comes from the Defense Intelligence Agency translation of "Soviet Analysis of Operation Desert Shield and Operation Desert Storm," quoted in Krepinevich and Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy,* 216.

evolution, and operational innovation."[425] ONA's assessment led Marshall to sponsor a research program that included more than 70 wargames and workshops over several years.[426] These two efforts shaped the defense policy subsystem for the remainder of the 1990s and beyond by spurring many senior leaders and small organizations within the defense policy subsystem to think differently about the US military of the 21st Century.[427]

The second external event, the advent of the post-Cold War era, ushered in a series of contingencies and threats which challenged US Cold War era military organizations and defense policies. US responses to Somalia, Haiti, and Bosnia included a variety of military operations that significantly contrasted the Cold War emphasis on large-scale conflict. At the same time, the risk of large-scale conflict did not go away. The specters of increasingly powerful regional actors, such as Iraq and North Korea, drove the US to plan for two nearly simultaneous Major Theater Wars (MTWs).[428] In the early post-Cold War era, the US military operations placed significant demands on its shrinking force structure, much of which looked similar to that of the Cold War. The uncertainty of the post-Cold War strategic environment and the conflicting strategic requirements to provide military forces for contingencies and major theater wars restrained any attempts within the Department of

---

[425] Ibid., 223.

[426] Andrew Marshall asked Jeff McKitrick to run the research program when McKitrick left ONA for Science Applications International Corporation (SAIC) in 1993. McKitrick recommended calling the program the Revolution in Military Affairs to avoid a focus on technology, Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.

[427] The Military Technical Revolution, later renamed the Revolution in Military Affairs, gained momentum in the mid-1990s and became the basis for many initiatives associated with transformation in the late 1990s. Ibid., 223. ONA members discussed their research with forward thinking senior leaders, such as General Gordon Sullivan and General Charles Krulak. Additionally, Dr. Andrew Krepinevich, the author of the MTR assessment, became the director of the Center for Strategic and Budgetary Assessments, an influential defense policy think-tank, after his retirement, Andrew F. Krepinevich, interview by Ryan Kendall, February 4, 2022; Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.

[428] The 1997 NMS specifically designates Northeast Asia and the Arabian Gulf as the most likely regions for simultaneous Major Theater War, General John M. Shalikashvili, "National Military Strategy of the United States of America," 1997, 15.

Defense for sweeping change.[429] Instead, senior leaders within the services, such as Army Chief of Staff Gordon Sullivan and Marine Corps Commandant Charles Krulak, led their services through periods of intellectual change and experimentation.[430]

### A.2 Internal Parameters

Four factors shaped the defense policy subsystem's internal parameters leading up to the JFCOM's joint experimentation process. First, two Congressional actions established requirements that would shape defense reform and joint experimentation in the late 1990s and early 2000s. The 1997 National Defense Authorization Act (NDAA) required the Department of Defense to conduct a Quadrennial Defense Review (QDR). Modeled off the Bottom-up Review of the early 1990s, the QDR examined the state of the military against its ability to address future threats. The final report reinforced the nascent momentum surrounding advancements in technology and a potential RMA, stating that "the information revolution is creating a Revolution in Military Affairs that will fundamentally change the way US forces fight."[431] While Secretary Cohen and General Shelton lauded the QDR as a way to breathe new life into the Department's defense strategy, the final report left many disappointed, seeing it as "a run-of-the-mill DoD study that failed to challenge the status quo by making difficult choices and setting priorities."[432]

---

[429] John Hall provides an analysis of the impact of austerity periods on land forces, pointing out that the US Army suffered from a lack of strategic clarity, reduced budgets, and the immediate demands of contingency operations, see John W. Hall, "To Starve an Army: How Great Power Armies Respond to Austerity," in *Sustainable Security: Rethinking National Security Strategy*, ed. Benjamin Valentino and Jeremi Suri (New York, NY, 2016).

[430] Concept development and experimentation during the 1990s primarily occurred within the services. General Gordon Sullivan led the Army through doctrine reform and the New Louisiana Maneuvers; General Charles Krulak led the Marine Corps through the Sea Dragon experimentation campaign. For summaries of service experimentation see, National Research Council, *The Role of Experimentation in Building Future Naval Forces*, 2004, https://doi.org/10.17226/11125.

[431] William S. Cohen, "Report of the Quadrennial Defense Review" (Department of Defense, May 1997), iv.

[432] "Quadrennial Defense Review: From 1997 to 2001," *AUSA Defense Report*, June 2000, https://www.ausa.org/sites/default/files/DR-00-1-Quadrennial-Defense-Review-From-1997-to-2001.pdf.

In anticipation of such an outcome, Congress simultaneously commissioned the National Defense Panel, an independent body tasked to review the Department of Defense's first QDR findings and recommend alternative force structures for the Armed Forces through 2010 and beyond. Congress used the NDP to push the Pentagon beyond its traditional incremental recommendations in favor of fundamental changes that aligned defense policy with the 21st Century.[433] Rather than providing alternative force structures, the Panel decided to take a more holistic approach and offered recommendations to align the national security apparatus with forecasted strategic challenges. Central to the Panel's recommendations was establishing a Joint Forces Command that "would be the force provider to the geographic CINCs, address standardization among the various Unified commands, oversee joint training and experimentation, and coordinate and integrate among the networked service battle labs."[434] In addition, the Panel saw joint experimentation, rather than service experimentation, as a priority: "Although each service may be interested in doing experiments to examine its own role in the future, the real leverage of future capabilities from experiments is in the joint venue."[435]

The NDP's recommendations fueled existing Congressional concerns regarding modernization. Frustrated by the Department's predictably mediocre response to the QDR, Senators Coats and Lieberman considered legislation "to implement the transformation strategy that was articulated in the NDP."[436] This legislation included a separate combatant command with a three to five billion dollar budget over five years for establishing the

433 John E. Tedstrom and John G. McGinn, "Planning America's Security: Lessons from the National Defense Panel" (RAND, 1999), 3.
434 Philip A. Odeen, "Transforming Defense: National Security in the 21st Century" (Arlington, VA: National Defense Panel, December 1997), v.
435 Ibid., 68.
436 Lieberman discusses this consideration as he reflected on how much had been done since Congress commissioned the NDP, see Senator Joe Lieberman, "The Efforts of the Military Services in Implementing Joint Experimentation," § Subcommittee on Emerging Threats and Capabilities of the Committee on Armed Services, United States Senate (1999).

headquarters, joint experimentation, and complete control over service experimentation. However, Admiral Harold Gehman, the US Atlantic Command (USACOM) Commander, and General Hugh Shelton argued against such legislation, favoring designating USACOM as the executive agent for joint experimentation and holding off on selecting a joint acquisition authority.[437] In May 1998, the Department of Defense responded by designating USACOM, already responsible for joint training, as the executive agent for joint experimentation.[438] This compromise took a critical, albeit incremental, step for joint experimentation.

Third, the increasingly austere budgetary environment placed a premium on funds available to the services for experimentation and modernization. By 1998, the US defense budget comprised a little more than 3 percent of the US Gross Domestic Product, the lowest percentage since World War II.[439] In addition, modernization funds increasingly became victim to expensive contingency operations such as in Somalia and Bosnia. General John Shalikashvili noted that the service chiefs had "gone as far as they could go" with force structure cuts to meet the rising operational tempo.[440] While service chiefs wanted to modernize and re-orient elements of their forces towards the 21st Century, the budget environment and the uncertainty associated with contingency operations made those efforts

[437] Word had reached Gehman and Shelton that the SASC was considering legislation that would establish a Joint Forces Command with acquisition authority and complete control over service experimentation efforts. Shelton and Gehman argued against such a significant reform. They preferred to leave services alone as much as possible. Col John A. Gallinetti, interview by Dr. William R. McClintock, n.d.

[438] US Atlantic Command held functional responsibilities, such as joint training, joint force provider, and joint experimentation, and geographic responsibilities such as the Caribbean. See Edward J. Drea et al., *History of the Unified Command Plan 1946-2012* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 2013), https://www.jcs.mil/Portals/36/Documents/History/Institutional/Command_Plan.pdf.

[439] Based on World Bank data at "U.S. Military Spending/Defense Budget 1960-2022," accessed April 4, 2022, https://www.macrotrends.net/countries/USA/united-states/military-spending-defense-budget.

[440] General Shalikashvili's comments came in response to questioning from committee members regarding the impact of contingency operations on readiness and modernization efforts, The Honorable William S. Cohen and GEN John M. Shalikashvili, "FY1998 Defense Department Budget Proposal," § Senate Armed Services (1997).

increasingly challenging.[441] The pressures of reduced funding and the need to modernize made services initially suspicious of additional joint efforts to place controls on service experimentation and modernization.

Fourth, the Chairman of the Joint Chiefs, General John Shalikashvili, increased his influence and the influence of the combatant commanders on service budgets at the expense of the Service chiefs. The Goldwater-Nichols Act empowered the Chairman to provide the Secretary of Defense with an assessment of service budgets. Shalikashvili used two planning documents, the Chairman's Program Assessment (CPA) and the Chairman's Program Review (CPR), to influence the Secretary of Defense's budgetary guidance to the Services. The CPA and the CPR relied on the analytical processes of the Joint Readiness Oversight Council (JROC), an advisory council designed to assess programs and frame resource advice.[442] Vice Chairman of the Joint Chiefs, Admiral Bill Owens, oriented the JROC process on nine assessment areas, known as Joint Warfighting Capability Assessments (JWCA), that examined joint issues such as command and control and ground maneuver.[443] Ideally, the JROC would be the process through which joint experimentation results would receive the advocacy and resources needed to change joint warfighting capabilities.

---

[441] A 1999 Defense Science Board report highlighted a significant difference between the vision statements of the services and their procurement budgets. Although services individually conducted experiments and conceptualized service challenges in the future, they lacked the budgets to support the requisite modernization, see Ted Gold, "Report of the Defense Science Board Task Force on DoD Warfighting Transformation," September 1999, https://apps.dtic.mil/sti/pdfs/ADA369135.pdf.

[442] Richard M. Meinhart, *Joint Strategic Planning System Insights: Chairmen Joint Chiefs of Staff 1990 to 2012*, Letort Papers (Carlisle, PA: Strategic Studies Institute and U.S. Army War College Press, 2013), 20.

[443] Robert Holzer, "JCS Quietly Gathers Up Reins of Power," *Defense News*, June 13, 1994, A1–2.

## B. EXPERIMENTATION INPUTS

### B.1 Military Communities of Practice

Joint experimentation occurs above the individual service level and therefore involves an increased number of military communities of practice. While those inside the services form their own communities of practice, outside the services, communities of practice become less anchored to an organization and therefore less coherent. However, for this case, broad categorizations help capture the ideological competition of the period.

During this case study, the three predominant military communities of practice in the defense policy subsystem were the RMA-Optimists, the RMA-Skeptics, and the Services. Most favored some degree of change, but each saw change from different perspectives. Moreover, the increased calls for defense reform from Congress and policy-influencing individuals and organizations outside government opened a window of competition between the different communities. The period of JFCOM's joint experimentation leading up to and including Millennium Challenge 2002 represented an intense period in this competition. As a result, each community advocated not only for their ideas but also for their preferred problem-solving processes.

#### *RMA-Optimists*

Over time, ONA's early assessments on the Military Technical Revolution began to give way to an increasing focus on technologies.[444] To counter this trend, ONA started referring to the MTR as a "Revolution in Military Affairs" (RMA), a phrase that eventually became shorthand for the promise of advanced technologies rather than the broader combination of organizational design, operational concepts, and technologies Marshall intended. RMA-Optimists latched on to increasingly common language in policy documents,

[444] Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.

such as the 1997 Quadrennial Defense Review, emphasizing how information technologies would provide increased speed and decisiveness, extending US military dominance well into the future.[445] As a result, discourse in the defense policy subsystem began to take on a series of talking points increasingly separated from their intellectual foundation.

The RMA-Optimists included a wide variance of belief in the promise of the RMA. Some, like Admiral Bill Owens, thought the combination of intelligence, command and control, and precision capabilities had "the ability to reduce the fog and friction of war and promis[ed] to do even more so in the future."[446] Others, such as VADM Arthur Cebrowski, saw technology as the stimulus to change, emphasizing the need for experimentation and prototyping.[447]

***RMA-Skeptics***

In contrast to the RMA-Optimists, some placed a greater emphasis on war's human factors, such as the political, social, and cultural forces that historically shaped warfare. RMA-Skeptics saw technologies as a necessary component of military power, but they focused more on the organizations and concepts that would shape future warfare. Members of this community highlighted the role of the adversary and their ability to thwart purely technological solutions, opting instead for asymmetric capabilities that nullified US advantages at a lower cost.[448] This difference in thinking caused them to push back against

---

[445] The QDR links the information revolution with "a Revolution in Military Affairs that will fundamentally change the way U.S. forces fight." in William S. Cohen, "Report of the Quadrennial Defense Review" (Department of Defense, May 1997), https://history.defense.gov/Portals/70/Documents/quadrennial/QDR1997.pdf?ver=qba2TZwCFGClTKIgPlPnvg%3d%3d, iv.

[446] ADM William A. Owens, "The Emerging U.S. System-of-Systems," *Institute for National Strategic Studies Strategic Forum*, no. 63 (February 1996), 4.

[447] Krepinevich and Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy,* 242.

[448] Chapter 8 in *The Last Warrior* highlights how many of those involved in the early ONA efforts to explore the RMA held these viewpoints, Ibid.

what they saw as an overemphasis on technological and scientific approaches to warfare, fearful that its promise ignored war's uncertainty and friction.

Like war itself, RMA-Skeptics believed that change was extremely difficult, questioning the US military's ability to reform itself. However, they played active roles in the process. Individuals such as Marshall, Krepinevich, and Van Riper saw experimentation and thoughtful analysis as part of a more extensive concept development process as the keys to defense reform, but they remained skeptical of technology-biased solutions to warfare. Van Riper became a regular participant in Army wargames and experiments with the Training and Doctrine Command (TRADOC).[449] Marshall and Krepinevich actively advocated for joint experimentation, emphasizing the importance of exploring potential threat responses to the capabilities associated with the RMA.[450]

***Services***

Even with their increased operational tempo and constrained budgets, each of the Services found ways to think about how the changing security environment would impact their Title 10 responsibilities.[451] For example, the Army's New Louisiana Maneuvers included a series of experiments and wargames focused on the impact of the post-Cold War environment (see Chapter 3). Additionally, towards the end of the 1990s, each Service had an experimentation program and established separate organizations to support experimentation. For example, the Marine Corps established a Marine Corps Warfighting

[449] LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.
[450] Andrew F. Krepinevich, interview by Ryan Kendall, February 4, 2022; Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.
[451] Service Title 10 responsibilities include, among others, recruiting, organizing, training, equipping, and sustaining a force to meet the roles and missions assigned to each service, see "Armed Forces," 10 USC § (2021), https://www.law.cornell.edu/uscode/text/10/subtitle-A.

Laboratory in 1995, and the Air Force established its Battle Labs in 1997.[452] Each Service experimentation effort included Service concepts and associated acquisition programs, such as the Army's Commanche and the Crusader. While Services found ways to integrate sister services into their experimentation programs, it was mostly to further their interests.

The increasing maturity of these efforts strengthened service tendencies to plan for a future of their making. The hyper-competitive budgetary environment only reinforced the services' inward-looking tendencies. Any joint experimentation and concept development effort would have to win over these individual service communities of interest. Services began to include the language from *Joint Vision 2010* in their concepts, experiments, and programs, but they did so from a service-specific lens. Each focused their efforts on how to operate in a future environment where they were the leading actor. For example, each Service had a simulation capability that replicated potential warfare scenarios based on differing assumptions regarding their capabilities and those of the other services.[453] Senior defense leaders acknowledged the maturity of service experimentation, seeing it as a foundation for future experimentation.[454]

### B.2 Senior Leader Sponsorship and a Theory of Victory

In contrast to service experimentation, joint experimentation requires a greater degree of senior sponsorship to overcome the political forces associated with the diverse institutions that share power and responsibility in the defense policy subsystem. Unlike in a

[452] The Marine Corps and Air Force Battle Labs built off Army's Training and Doctrine Command's Battle Lab concept developed by General Fred Franks. The Navy established the Navy Warfare Development Command in 1998. For a history of service experimentation programs see National Research Council, *The Role of Experimentation in Building Future Naval Forces*, 2004, https://doi.org/10.17226/11125. For information about the early days of the Air Force Battle Labs see Peter Grier, "From the Battlelabs," *Air Force Magazine* (blog), September 1, 1998, https://www.airforcemag.com/article/0998labs/.

[453] BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.

[454] General Hugh Shelton, Chairman of the Joint Chiefs acknowledged the maturity of service programs as a starting point for future joint experimentation, The Honorable Mac Thornberry and GEN Henry H. Shelton, "Fiscal Year 2001 Defense Budget," § House Armed Services Committee (2000).

service, where a service chief focuses consensus-building efforts on a group of senior officers and political appointees to influence change, power is more diffuse at the joint level, and interests are more entrenched. As the 1997 QDR process demonstrated, bureaucratic battles in this policy environment drove decision-makers to prefer the status quo, favoring a situation where all stakeholders win by not losing. Joint experimentation required senior leader sponsorship from a diverse power base to overcome the system's inertia and break down the initial resistance to change.

***Congress as sponsor***

Rather than a single individual, the Armed Services committees, led by bi-partisan, bi-cameral support from Senators Lieberman and Coats, and Representative Thornberry, provided the initial senior sponsorship.[455] Congressional action to commission the NDP emphasized the necessity of joint experimentation, successfully delivering the initial resources to begin joint experimentation. After General Shelton lobbied for a compromise to the NDP's recommended implementation plan that resulted in USACOM as the executive agent for joint experimentation, Congress formalized its sponsorship through the 1999 NDAA. This legislation required the designation of a combatant commander responsible for joint experimentation and annual reports to Congress on joint experimentation activities and results.[456] Within a year, increasing concerns about emerging threats led Shelton to recommend a change to the Unified Command Plan (UCP), designating USACOM as Joint Forces Command (JFCOM) to "serve as the lead joint force

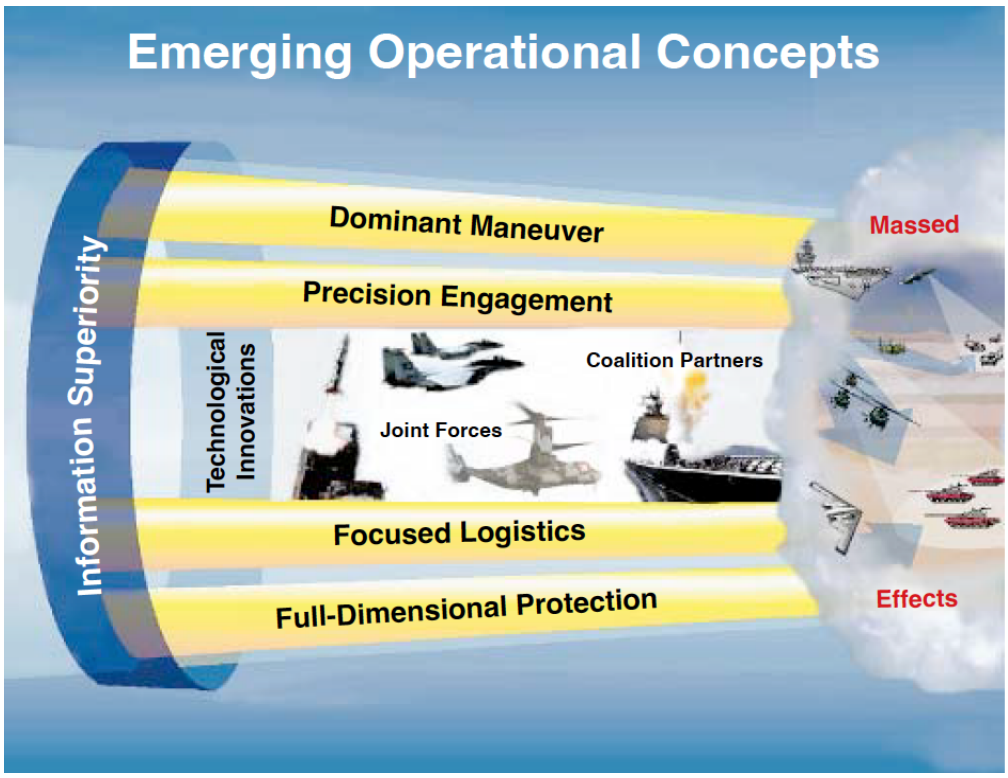
[455] Maj Gen Peppe, the Director of Joint Experimentation when JFCOM was established commented on how he was surprised by the level of political support from the Armed Services Committees in Congress, Maj Gen Timothy A. Peppe, interview by Dr. William R. McClintock, May 4, 2000; Col John Gallinetti cited the efforts of Senators Coats, Lieberman, Roberts, and Warner, in addition to Rep. Thornberry in securing funding for joint experimentation, Col John A. Gallinetti, interview by Dr. William R. McClintock, April 21, 1999.

[456] The FY1999 NDAA required the designation of a combatant commander responsible for joint experimentation and the requirement for annual joint experimentation reports to Congress, see "Strom Thurmond National Defense Authorization Act for Fiscal Year 1999," Pub. L. No. 105–261, § 922-923 (1998).

integrator, the lead agent for joint force training, and the DOD executive agent for joint force experimentation," as well as coordinating DOD responses to weapons of mass destruction attacks on the US.[457] The establishment of JFCOM in October 1999 elevated the profile of joint experimentation, but JFCOM's diverse missions would initially reduce the attention it received within the command.

***Joint Visions 2010: a Theory of Victory***

Figure 4.2: *Joint Vision 2010* Emerging Operational Concepts




The Chairman's vision document, *Joint Vision 2010,* provided a theory of victory to support initial concept development and experimentation activities (see Figure 4.2).

[457] Edward J. Drea et al., *History of the Unified Command Plan 1946-2012* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 2013), https://www.jcs.mil/Portals/36/Documents/History/Institutional/Command_Plan.pdf, 5.

Shalikashvili intended *Joint Vision 2010* to serve as "the conceptual template for how [the joint force] will channel the vitality of our people and leverage technological opportunities to achieve new levels of effectiveness in joint warfighting." Similar to other strategic documents such as the QDR and National Military Strategy, *Joint Vision 2010* espoused the promise of technological advances that would support a new degree of information superiority as the foundation for joint operations in 2010:

> The basis for this framework is found in the improved command, control, and intelligence which can be assured by information superiority. These are the most straightforward applications of much of the new technology; however, the full impact of these technologies is more profound. Enhanced command and control, and much improved intelligence, along with other applications of new technology will transform the traditional functions of maneuver, strike, protection, and logistics. These transformations will be so powerful that they become, in effect, new operational concepts: dominant maneuver; precision engagement; full dimensional protection; and focused logistics.[458]

As depicted in Figure 4.2 above, technological innovations would result in information superiority, the critical assumption undergirding the operational concepts. The combined impact of these operational concepts would create "massed effects" to achieve "full spectrum dominance," the ability to dominate the full range of military operations from humanitarian assistance, through peace operations, up to and into the highest intensity conflict.[459]

The four operational concepts, dominant maneuver, precision engagement, full dimensional protection, and focused logistics, represented the transformation of existing concepts due to the application of the espoused new technologies. For example, the dominant maneuver was the "multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, land, sea, and space

---

[458] GEN John M. Shalikashvili, "Joint Vision 2010" (Office of the Chairman of the Joint Chiefs of Staff, July 1996), https://www.airforcemag.com/PDF/DocumentFile/Documents/2005/jv_2010_071696.pdf, 19.
[459] Ibid., 25.

forces to accomplish assigned operational tasks."[460] The increased access to knowledge about the battlefield due to the proliferation of dispersed sensors and connected systems enabled US forces to maintain a speed and tempo that forced the enemy to react from a position of disadvantage or quit.[461] The remaining three operational concepts portrayed similar high-end capabilities due to the promise of advanced technologies.

*Joint Vision 2010* was significant because it codified the more techno-centric ideas of RMA-Optimists in an official policy document. Vice Chairman of the Joint Chiefs Admiral Owens, a vocal Technologist, had been able to influence the *Joint Vision 2010*. Although it fell short of his more controversial ideas about information technologies' ability to lift the fog of war, it reinforced the technology bias already existent in the policy discourse.[462] As the officially sanctioned joint theory of victory, it served as the bureaucratic stepping-off point for experimentation and concept development. The assumptions associated with the promise of technology inherent in the *Joint Vision 2010* would carry forward into the joint concept development and experimentation efforts of JFCOM.

*Joint Vision 2010* rested on critical assumptions regarding US military and technological dominance and US military superiority and moved the policy discourse away from the intellectual work of ONA's assessments and research programs. As Hew Strachan pointed out, RMA-based concepts such as *Joint Vision 2010* "assumed the use of military force in an offensive mode, based on overwhelming and apparently unanswerable military superiority."[463] These assumptions resulted in overly optimistic language that overstated

---

[460] Ibid., 20.
[461] Ibid., 20.
[462] Krepinevich and Watts describe Owens's influence on the *Joint Vision 2010* while acknowledging that Marshall did not have an opinion on the document, see Chapter 8, Krepinevich and Watts, *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy*.
[463] Hew Strachan, *The Direction of War: Contemporary Strategy in Historical Perspective* (Cambridge, UK: Cambridge University Press, 2013), 18.

capabilities and generated a series of empty bumper-sticker slogans that lacked intellectual depth.

Additionally, *Joint Vision 2010* had no enemy to orient conceptual development. Although China was the presumed strategic threat of the future, defense assessment efforts such as the QDR and joint experimentation could not include China due to political concerns.[464] Without a threat to conceptually limit and shape US capabilities and the offensive orientation of the capabilities, technological optimism ran unbounded within the RMA-optimist community, discounting any concerns about how competitors may respond to the proliferation of lethal capabilities. The lack of an agreed upon threat left the Services unconstrained to develop their own separate visions of future warfare cloaked in the language of *Joint Vision 2010*. To build consensus, joint experimentation would have to bring all these separate visions of the future into alignment.

**B.3 Core Advocacy Network**

JFCOM's joint experimentation process began with a significantly influential core advocacy network that extended across the senior levels of the executive and legislative branches. The House and Senate Armed Service Committees' consistent attention helped prioritize joint experimentation and drove the services to acknowledge its level of importance. Additionally, congressionally sponsored studies, such as the National Defense Panel, injected new ideas concerning defense reform and the central role of experimentation. Its members, like Andrew Krepinevich, remained prominent players in the policy subsystem. As the Director of the Center for Strategic Budgetary Assessments, Krepinevich helped

[464] JFCOM's Unified Vision 2001 originally used an Asia-Pacific scenario that had to be reoriented due to Clinton administration concerns about ongoing policy efforts to bring China into the international order. Similar political concerns impacted an analysis of China during the QDR, Senior JFCOM planner, interview by Ryan Kendall, February 24, 2022, comments from advisor Dr. Stephen Rosen, March 14, 2022.

extend advocacy from outside the government and across the policy subsystem.[465] General Shelton's continued sanctioning of the *Joint Vision 2010* ensured its foundational ideas continued to shape concept development and thinking within the Department of Defense. Finally, the newly minted JFCOM commander, Admiral Gehman, benefited from the bureaucratic top-cover to begin the experimentation process and further develop the ideas of *Joint Vision 2010*.

## C. CHARACTERISTICS OF EXPERIMENTATION

### C.1 Entering the Fray: JFCOM's Early Joint Experiments and Concept development

JFCOM's early efforts focused on building a robust joint experimentation process and developing joint concepts that supported experimentation. To accomplish these objectives, JFCOM planners faced the daunting task of building support for joint concepts and experimentation at the organizational echelons below the veneer of senior leader sponsorship. Even with significant senior leader sponsorship, JFCOM planners encountered several challenges. Despite early struggles with funding and personnel, JFCOM executed its first two joint experiments, JE99-01 and Millennium Challenge 00, within the first year and a half and developed the beginnings of a joint integrating concept called Rapid Decisive Operations (RDO). However, as JFCOM's initial concept development and experimentation activities stumbled, the bureaucratic pressure increased. These pressures incentivized JFCOM leaders to focus on short-term gains rather than JFCOM's longer-term objectives, a focus that negatively impacted future concept development and experimentation. As the Bush Administration prepared to enter office, JFCOM had successfully extended the breadth

[465] Krepinevich testified before Congress and often met with defense policy officials to discuss defense transformation, Andrew F. Krepinevich, interview by Ryan Kendall, February 4, 2022.

of its advocacy network, but not to a sufficient degree to relieve the significant pressures from outside interests.

***Early struggles***

JFCOM's establishment came after almost of year of efforts by the previous command, USACOM, to establish a separate directorate, known as J9, for the experimentation and concept development mission. Although J9 had the support of Congress and the USACOM commander, J9 planners ran into four issues that delayed their ability to establish a joint experimentation program. First, due to a lack of personnel and expertise in joint experiments, the J9 relied on external sources, such as the Institute for Defense Analyses (IDA) and the Department of Defense Advanced Research Projects Agency (DARPA), as part of the Joint Advanced Warfighting Program for its first experiment, JE99-01, in August 1999.[466] Second, Congressional Appropriations committees and the Department of Defense Comptroller delayed the J9's funding, despite the high degree of sponsorship from the House and Senate Authorization committees. As a result, the J9 did not receive the final $16 million of its FY99 budget of $30 million until the last two weeks of the fiscal year. This delay made it difficult for the J9 planners to expend the funds, which subjected them to further scrutiny during future budget cycles.[467]

Third, Joint experimentation was a new phenomenon for JFCOM and the defense policy subsystem. Therefore, J9 had to educate incoming personnel on the differences between experimentation and more common military problem-solving approaches such as

---

[466] "Military Transformation: Actions Needed To Better Manage DOD's Joint Experimentation Program," Report to Congressional Committees (Washington, D.C.: United States General Accounting Office, August 2002), https://congressional-proquest-com.ezproxy.lib.utexas.edu/congressional/result/congressional/congdocumentview?accountid=7118&groupid=114746&parmId=17402AE0C04#483.

[467] Since J9 did not spend what was originally appropriated to them, those outside the J9 made the argument they did not need the same level of funding in the FY01 budget cycle, Maj Gen Timothy A. Peppe, interview by Dr. William R. McClintock, May 4, 2000.

wargaming and training. Fourth, because JFCOM's program was an unknown entity, it attracted suspicion. Admiral Gehman's early guidance was for the J9 leadership to visit defense research labs, Service experimentation organizations, and academic institutions to understand best practices better while simultaneously attempting to reduce any distrust amongst those in the defense policy subsystem. This guidance initially facilitated extending the advocacy network but came at a cost. Extensive time away meant the leadership was not available to participate in J9's first experiment. The J9 Director, Major General Peppe, highlighted the impact of outsourcing the J9's first experiment: "following the CINC's [Admiral Gehman's] advice to spread the word and the gospel, we had everybody spread thin…We got criticized because we didn't have some military totally involved."[468]

***The Services and Joint Experimentation***

A significant challenge for JFCOM from the outset was building buy-in with the services for both joint concept development and experimentation. By 1999, each Service had a well-developed concept development and experimentation program. In contrast, the J9 had conducted one experiment, relying on others to complete it. The initial reaction from the services was to protect not just the programs, but the resources they had husbanded to create them. One planner noted, "The services clearly were the [center of gravity] of joint experimentation. They had the experience, talent, and established programs in place… part of the problem was that the Service experimentation programs were not part of the JFCOM components."[469] Therefore, JFCOM planners had to rely on support from senior leaders across organizational boundaries, further complicating J9's ability to build momentum.

---

[468] Maj Gen Timothy A. Peppe, interview by Dr. William R. McClintock, May 4, 2000.
[469] COL(Ret) William Meade, interview by Ryan Kendall, February 21, 2022.

Some of the Services pushed back more than others, speculating that joint experimentation would lead to force structure decisions by people outside their individual Service. For example, the Marine Corps and Navy did not see the need for a joint organization to conduct experimentation and concept development: "Services, specifically the Marine Corps, and the Navy to an extent, said they didn't need a joint organization, defining what could be force structure for the services."[470]

Additionally, JFCOM was unsure how it should conduct joint experimentation. General Shelton believed that JFCOM could turn *Joint Vision 2010* into reality through "an aggressive experimentation program focused at the joint or 'seam' areas where the Services by themselves fell short."[471] Shelton and Gehman's lobbying of Senators Coats and Lieberman demonstrated the intent was not to take over service experimentation. However, the Service organizations responsible for experimentation and concept development did not necessarily understand these caveats, and they hamstrung initial efforts by J9 to lead joint experimentation. Maj Gen Peppe's comments reflected a similar perspective:

> I asked a year ago last month if we could take a more leading role in what was seen then as just getting the services together to do their experiments at the same time. I was told, no -- we're not going to play a leadership role -- just go in and leverage the service experiments.[472]

This hesitancy slowed JFCOM's efforts to lead the Services and served as yet another obstacle.

The initial reluctance of the services to participate was understandable given the bureaucratic politics of the defense policy subsystem at the time. Goldwater Nichols and the series of large-scale department force structure and strategy reviews of the 1990s had made the services hyper-sensitive to any initiative that may threaten their Title 10 roles. As one

[470] MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022.
[471] Ibid., 76.
[472] Maj Gen Timothy A. Peppe, interview by Dr. William R. McClintock, May 4, 2000.

senior officer remarked, "people have egos, services have egos, and the money provided by Title 10 doesn't help that. It hurts it."[473] The relationship with the Services would remain a challenge for the J9 planners through the first year and a half of the joint experimentation program.

***JFCOM's expansive mission***

While it received significant attention, J9's joint experimentation and concept development were one of several high-profile JFCOM missions. USACOM, as a result of reforms following the end of the Cold War, was both a functional and geographic combatant command, in addition to being one of two major NATO headquarters.[474] In the 1999 Unified Command Plant, JFCOM retained its previous responsibilities as USACOM while also assuming responsibilities as the lead federal agency managing the response to a domestic Weapons of Mass Destruction (WMD) Event.[475] These two responsibilities, NATO commander and lead federal agency for WMD response required a significant amount of JFCOM senior leader's energy, decreasing senior leaders' attention on establishing J9's concept development and experimentation programs.[476]

---

[473] GEN(R) Gary Luck, interview by Ryan Kendall, February 10, 2022.

[474] CJCS General Colin Powell had initiated the reforms to USACOM as part of a larger reform of the Unified Command Plan with Secretary Les Aspin. As one of two major NATO headquarters, USACOM joined SACEUR, see Edward J. Drea et al., *History of the Unified Command Plan 1946-2012* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 2013), https://www.jcs.mil/Portals/36/Documents/History/Institutional/Command_Plan.pdf, 67.

[475] Ibid., 76.

[476] The geographic location of the JFCOM NATO element impacted the time that the JFCOM Commanders focused on NATO. "The command deck at JFCOM spent a LOT of time in their NATO ACT/ACO role – that HQ was 100 yards from JFCOM HQ, while we were one or two bridge tunnels away (30-60 minutes and the tyranny of distance) – not conducive to a new Directorship (Joint Experiments/Concepts) that was expanding rapidly." COL(Ret) William Meade, interview by Ryan Kendall, February 21, 2022.

***Joint Concept Development: Rapid Decisive Operations***

JFCOM concept developers refined the broader ideas in *Joint Vision 2010* by developing the Rapid Decisive Operations (RDO) integrating concept. RDO integrated a collection of new command and control concepts for Small Strategic Contingencies (SSC) against a regional threat with capabilities that challenged US and Allied force projection operations. JFCOM planners described RDO in the following quote:

> The United States and its allies asymmetrically assault the adversary from directions and in dimensions against which he has no counter, dictating the terms and tempo of the operation. The adversary, suffering from the loss of coherence and unable to achieve his objectives, chooses to cease actions that are against US interests or has his capabilities defeated.[477]

J9 intended to use RDO as part of a joint experimentation process to "identify the changes to joint doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) and to define the joint context for future operations."[478]

RDO included four critical components. First, a Standing Joint Force Headquarters (SJTFHQ) provided an established command and control capability with standardized processes and the established relationships required for effective military operations. The SJTFHQ would be a core group of approximately 50 planners responsible for planning against potential contingencies within a given region. Once a potential crisis developed, the SJTFHQ would provide the knowledge base to begin any potential crisis response.

Second, Operational Net Assessment (ONA) leveraged systems analysis to understand an adversary's centers of gravity and critical vulnerabilities in relation to the environment and US capabilities. This systems analysis provided an assessment of friendly and enemy elements that would inform US decisions regarding potential combinations of

---

[477] Cash, Dean W. "Rapid Decisive Operations Working Draft." Joint Forces Command J9, August 22, 2001, ii.
[478] MG Dean W. Cash, "Rapid Decisive Operations Initial Concept Report" (Joint Forces Command, Fiscal Year 2000), 1.

military force and other sources of national power. Operational Net Assessment used modeling and simulations to "predict a range of possible outcomes if the adversary's critical nodes or vulnerabilities are neutralized." Additionally, these same processes would help "predict second and third order effects, unintended consequences, and the effectiveness of simultaneous application of multiple means."[479]

Third, Effects Based Operations (EBO) provided "an additional construct for offensive operations" where a commander massed effects in a way that provided for overwhelming immediate effect. "Effects" included physical, functional, or psychological outcomes that resulted from a chosen military or non-military outcome. EBO grew out of earlier Air Force targeting approaches made famous during the Gulf War. RDO took those concepts and applied them at the strategic, operational, and tactical levels and expanded the capabilities to include non-military sources of power.[480] Finally, EBO relied heavily on all aspects of national power, which required access to an Interagency group within the core planners of the SJTFHQ that could facilitate such a response.[481]

In parallel with its joint experimentation efforts, JFCOM J9 concept developers spent the first year reviewing published studies and wargame results, and connecting with a wide selection of policy officials from across the defense policy subsystem. Over time, these interactions included various perspectives, what one planner referred to as the "usual suspects of defense thinking," including Admiral Arthur Cebrowski, Netcentric Warfare, and former Navy Surface Warfare officer Harry Ulman, author of *Shock and Awe*.[482] In addition,

---

[479] Ibid., 18.

[480] Ibid., 28; LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.

[481] This summary does not include all the components of RDO. The four listed here are my understanding of what was both controversial and different about the concept. The summary is based on interviews with the concept developers and archival material, MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022; Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022; Cash, "Rapid Decisive Operations Working Draft."

[482] Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022.

engagements with the JFCOM advisory board included discussions with Representatives Newt Gingrich and Mac Thornberry, Senator Hillary Clinton, and defense policy experts like Kori Schake and Andrew Krepinevich.[483] Concept developers also presented their ideas at the different War Colleges in the DC area.

Concept development relied on a dedicated team of retired general officers led by retired four-star Army General Gary Luck. These retired general officers, referred to as the senior mentors by JFCOM, each had significant operational experience. Most had participated in joint training and service experimentation efforts throughout the late 1990s.[484] These senior mentors helped concept developers bring in different roundtable participants and focused efforts on challenging assumptions and roleplaying during experiments. Senior mentors played a critical role in helping sift through the expansiveness of different ideas from the J9's engagement efforts. J9 concept developers opted not to include the services at first. Instead, J9 concept developers authored a draft of RDO through a back-and-forth process with the senior mentors, avoiding the predictable negotiations with the Services over every phrase in the concept.

As RDO developed, the frustrations of the contingencies in the 1990s shaped what J9 developers understood as the problem RDO intended to solve.

> At that time, we were dealing with a couple of fast acting and quickly unfolding strategic things, such as the massacre in Africa [Rwanda] and Bosnia…One of the phrases was, does the US have the capability to stop the killing and stop the dying? Is it capable of responding to a rapidly unfolding crisis?[485]

---

[483] The JFCOM Commander's advisory board met multiple times a year, bringing together a diverse group of defense policy leaders to update them on JFCOM's progress and receive feedback. Admiral Giambastiani kept the Advisory Board in place after Millennium Challenge 2002, Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022; ADM(Ret) Ed Giambastiani, interview by Ryan Kendall, February 15, 2022.

[484] In addition to JFCOM, the Army's Training and Doctrine Command used senior mentors, to include LtGen Van Riper, to support their Title 10 wargames. LtGen (Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.

[485] Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022.

J9 concept developers saw RDO as a command and control concept rather than strictly a warfighting concept. The slow buildup of forces required to respond in Bosnia and Kosovo combined with the inability of the military to achieve political objectives quickly made military power cumbersome. Over time, RDO became less focused on the broader macro-concept ideas of the *Joint Vision 2010* and more focused on the narrow problem of command and control: "The problem was we didn't have kind of a standing command or control system that could quickly orient on the problem, direct, and assemble forces rapidly to put them into play."[486]

While the problem that RDO was intended to help solve may have been one that most could agree on, the components that undergirded RDO faced opposition, most notably from one of the senior mentors, Lieutenant General Paul Van Riper. Van Riper took issue with what he determined were two flawed assumptions of RDO. First, Operational Net Assessment relied on the idea that you could have enough information about an adversary that you could understand its vulnerabilities and track the non-linear changes that occurred within an enemy system during combat. Van Riper thought this was fantastical. For Van Riper, Operational Net Assessment's promise of knowledge superiority and knowing the enemy better than they knew themselves was well beyond a statement of hubris. Second, Effects Based Operations assumed the ability to predict second and third order effects. As Van Riper described, "…this is pure pseudoscience! Basically, they were thinking it was a world of cause and effect. I said no. Wars, battles, political parties- it's nonlinear. It's cascading effects, and you can't follow the cascading effects."[487] To Van Riper, EBO had

[486] Ibid.
[487] LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.

been a good concept for Air Force targeting, but concept developers took these ideas beyond their original usefulness over time.[488]

These two issues formed the core of Van Riper's narrative that built throughout the experimentation process and came out in his public comments following Millennium Challenge. Van Riper's grievances became further entrenched the more he lost faith in JFCOM's experimentation process.

***The pressure to produce***

JFCOM's early experimentation and concept development efforts were not producing tangible results fast enough to satisfy the increasing bureaucratic pressures. These pressures came in many different forms from multiple sources. First, J9 faced increasing pressure from the Joint Staff. One planner recalled, "There was so much pressure on us to do so many things that we were not focused. We were trying to justify JFCOM to fight back against the antibodies." In particular, the Joint Staff J7, Major General George Close, was frustrated that JFCOM had been "spending millions but producing nothing."[489] Even though JFCOM was the joint experimentation executive agent, Congress continued to require the J7 to testify on joint integration efforts, causing officers like MG Close to apply bureaucratic pressure when they felt it was necessary. Second, Congress, while supportive, was also becoming impatient. The language during hearings tended to be positive, but for some Congressional members, like Senator Pat Roberts, their patience was wearing thin. His opening comments during a Senate hearing reflected the frustrations of many Congressional members with defense reform:

---

[488] Ibid.

[489] One J9 concept developer recalled a very tense briefing with MG Close shortly after arriving at J9. The staff officer was presenting some white papers to MG Close, who after a series of questions became increasingly upset. "Close asked a bunch of questions that I had no clue the answers to, and he was like alien all over my face," Senior J9 Concept Developer, interview by Ryan Kendall, February 21, 2022.

> I am concerned, if not frustrated, about the transformation process within the Department of Defense. I do not see how the process currently in place promotes and supports the level of meaningful change necessary to meet the challenges of the 21st Century.[490]

Congressional members, such as Senators Dan Coats and Joe Lieberman, had built support for language in previous NDAA's to prod the Department of Defense in the direction of reforms that emphasized the importance of joint operations to live up to the ideals of the Goldwater-Nichols Act. Yet lessons learned from operations in Kosovo instead, as Senator Roberts pointed out, looked "remarkably similar to those lessons learned over 8 years ago in Operation Desert Storm."[491] So Congress chose to prod even harder by mandating a joint experiment, including all the services and Special Operations Command, in FY2002.[492]

Congressional pressure varied between the Congressional members on Authorization committees and the staffers working for those on the Appropriations committees. The J9 Director, MG Dean Cash, recounted:

> The Congressional pressure was significant. Representatives did come and visit, but it was the senate senior staffers who came and wanted to know money spent and why, return on investment and why, when are we going to see doctrinal changes, and why? What is the justification for dollars pulled away for training and spent on experimentation?[493]

The combined pressures of meeting the expectations of their Congressional senior leader sponsors and having to justify the worth of their efforts to appropriators pushed JFCOM to

---

[490] Senator Pat Roberts opening statement, see Senator Pat Roberts, "The Efforts of the Military Services in Implementing Joint Experimentation," § Subcommittee on Emerging Threats and Capabilities of the Committee on Armed Services, United States Senate (1999).
[491] Ibid.
[492] In addition to mandating the joint experiment, the NDAA included an additional $2 Million to support planning for the experiment, see John Warner, "Press Release: Senate and House Complete Conference on National Defense Authorization Bill for Fiscal Year 2001," October 6, 2000, https://www.armed-services.senate.gov/imo/media/doc/01conf.pdf.
[493] MG Dean W. Cash, interview by COL Janet Tucker, February 14, 2001.

favor size, scale, and speed in their concept development and experimentation process despite their limitations with personnel.[494]

***Extending and Reinforcing the Network***

Even with J9's challenges, the concept development and experimentation process provided senior leaders and staff officers the opportunity to extend their advocacy network. As the ideas for RDO became more developed and coherent, the frequency and diversity of concept developers' interactions helped to strengthen support for JFCOM. Experimentation activities also began to bring in the Services. For example, Millennium Challenge 00 (MC00), JFCOM's first joint field experiment, included live participation from each Service. Although both JFCOM leaders and the Services were initially reluctant to have J9 lead experimentation, over time, their perspectives changed. As Maj Gen Timothy Peppe, J9 Director, recalled:

> The problem we had was that the services…were looking for someone to take the leadership role -- including me getting telephone calls from some of my fellow flag officers almost begging us to get involved in leading this endeavor. Otherwise, it might not be able to be pulled together, because there was no clout behind it.[495]

MC00 served as a forcing function to bring the Services together, but it primarily reflected their Service concepts. As a field experiment, MC00 tied together live forces from each of the Services under a common scenario. The experiment provided lessons learned that would inform the live portions of Millennium Challenge 2002. Still, most importantly, it helped cement J9's role in the joint experimentation process and reduced any Service

[494] The impact of these pressures on J9 was a consistent theme of interviews with both J9 Directors and the staff officers associated with concept development and experimentation, MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022; Jim Hutton, interview by Ryan Kendall, February 24, 2022; COL(RET) Lawrence King, interview by Ryan Kendall, February 9, 2022; Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022; Maj Gen Timothy A. Peppe, interview by Dr. William R. McClintock, May 4, 2000.
[495] Maj Gen Timothy A. Peppe, interview by Dr. William R. McClintock, May 4, 2000.

reluctance. Congressional testimonies from Service representatives reflected the increased importance of JFCOM and its role as the executive agent of joint experimentation.[496]

Senior leaders, such as General Shelton, continued to support JFCOM's concept development and experimentation efforts, further extending and strengthening the advocacy network. General Shelton's *Joint Vision 2020* built upon "the conceptual template established by Joint Vision 2010 to guide the continuing transformation of America's Armed Forces."[497] *Joint Vision 2020* did not change the fundamental ideas of its predecessor. Instead, it continued to posit that the operational capabilities of dominant maneuver, precision engagement, focused logistics, and full dimensional protection would produce full spectrum dominance.[498] *Joint Vision 2020* affirmed this vision of future warfare, of which RDO was a small part, further extending its influence. Additionally, *Joint Vision* 2020 identified JFCOM's joint concept development and experimentation efforts as the official process that would realize this vision: "The joint force require[ed] capabilities that are beyond the simple combination of Service capabilities, and joint experimentation is the process by which those capabilities will be achieved."[499]

By the end of 2000, J9 had successfully positioned itself in the center of joint experimentation and concept development. A J9 weekly situation report from early December 2000 reflects the diversity of its network and a high level of interest from areas across the policy subsystem. J9's activities ranged from hosting workshops with the CSBA that included subject matter experts from Congress, the Services, academia, and OSD to briefings with Service chiefs and COCOM commanders. Additionally, J9's activities included

[496] During testimony before the Senate, each Service representative outlined how their efforts connected with MC00. "Efforts of the Military Services in Implementing Joint Experimentation," Pub. L. No. Y4.AR5/3:S.HRG.106-361, § Subcommittee on Emerging Threats and Capabilities (1999).
[497] GEN Hugh Shelton, "Joint Vision 2020" (US Government Printing Office, June 2000), https://www.hsdl.org/?view&did=446826.
[498] Ibid., 6.
[499] Ibid., 34.

an increasing amount of NATO engagements as international interest in joint experimentation grew. J9's advocacy network began to reduce pressure from mid-level staff officers in the Pentagon. A summary of a meeting with Joint Staff, Office of the Secretary of Defense (OSD) Policy, and OSD Program Assessment & Evaluation (PA&E) in December 2000 demonstrates the impact of the J9's network:

> They have been looking for ideas from JFCOM for two years and were overjoyed to see how our thinking had progressed - "You are right on track with this." Both OSD offices think this will be a likely target for the new Defense team to immediately move "not a $ Billion, but certainly multiple $ millions" in their first few months.[500]

J9's limited strides to ease the myriad of pressures associated with bureaucratic politics came at a good time. The momentum for change began to build with the advent of a new Presidential administration.

**C.2 A New Administration: Sustaining momentum for transformation**

The advent of the Bush Administration marked a significant turning point for joint experimentation. A myriad of factors hamstrung the Clinton-era defense leadership, most notably the combination of decreased budgets and unforeseen contingency operations. In contrast, the incoming Bush administration had been building support for increased defense budgets, a reduction in open-ended peace-keeping operations, and the transformation of the Department of Defense and the military services. During the campaign, President Bush had made defense reform one of his key campaign issues, using a speech at the Citadel to advocate for sweeping changes:

> But defending our nation is just the beginning of our challenge. My third goal is to take advantage of a tremendous opportunity – given few nations in history – to extend the current peace into the far realm of the future. A chance to project America's peaceful influence, not just across the world, but across the years.

[500] Colonel Chris Shepherd, "CINC's Weekly SITREP for 7 December 00," December 7, 2000.

> Power is increasingly defined, not by mass or size, but by mobility and swiftness. Influence is measured in information, safety is gained in stealth, and force is projected on the long arc of precision-guided weapons. This revolution perfectly matches the strengths of our country – the skill of our people and the superiority of our technology. The best way to keep the peace is to redefine war on our terms.[501]

Bush's comments spoke to Congressional members who had been waiting for the Department of Defense to make reforms that mirrored the technology revolution of the private sector and took advantage of the so-called RMA to address the increasingly diverse threats of the post-Cold War. His speech and description of warfare served as talking points for Congressional members who attached his calls for reform with their initiatives to spur experimentation and innovation.[502]

As President Bush's selection to serve as Secretary of Defense, Donald Rumsfeld entered office with a mandate for change. Secretary Rumsfeld, who had served as Secretary of Defense during the Ford Administration, was very familiar with the Pentagon and came into office with significant bi-partisan support.[503] During his confirmation hearing, Rumsfeld reflected an understanding of the Department's significant challenges and the critical role of executive and legislative cooperation: "It's going to take a collaborative relationship within the executive branch and Congress. I just hope and pray that we are wise enough to do it well."[504] However, Rumsfeld avoided articulating specifics about particular programs or

---

[501] Governor George W. Bush, "A Period of Consequences, Speech at the Citadel," September 23, 1999, http://www3.citadel.edu/pao/addresses/pres_bush.html.

[502] Representative Thornberry reflected his use of different portions of President Bush's Citadel Speech as a way to communicate the need for defense policy reform, The Honorable Mac Thornberry, interview by Ryan Kendall, February 15, 2022; Senator Warner noted that President-elect Bush's comments to Committee members prior to Rumsfeld's confirmation hearing were well received by all members. He went on to refer to the Citadel speech as a "foundational speech for Bush defense policy," The Honorable John W. Warner, "Defense Secretary Nomination Hearing," § Senate Armed Services (2001).

[503] Senator Carl Levin's remarks during Rumsfeld's confirmation hearing lauded Rumsfeld for his previous service as Secretary of Defense and his recent service as Chairman of the US Ballistic Missile Threat Commission, an initiative sponsored by the Senate Armed Services Committee, The Honorable Carl Levin, "Defense Secretary Nomination Hearing," § Senate Armed Services (2001), https://www.c-span.org/video/?161702-1/defense-secretary-nomination-hearing.

[504] Confirmation hearing, Donald Rumsfeld.

areas to focus reform during his confirmation hearing. Instead, Rumsfeld emphasized the need to begin with a strategic review that would shape the upcoming Quadrennial Defense Review as a springboard to defense transformation.

***Defense Strategy Review and Transformation***

Rumsfeld turned to Andrew Marshall, the ONA Director, to help jumpstart a Defense Strategy Review (DSR). For Rumsfeld, Marshall provided a long-term perspective of the Department and the forward-thinking analytical capability separate from service interests. From Marshall's perspective, if there were ever a time when transformation could be possible, it would be under Rumsfeld.[505] As Rumsfeld waited on the Senate to confirm his more than 40 Department of Defense nominees following a very contentious Presidential election, he leaned on Marshall to help him organize a Defense Strategy Review.[506]

Rumsfeld used the Defense Strategy Review to take stock of the Department and the Services, begin building consensus around ideas, and establish a common language that would serve as an analytical foundation for the upcoming QDR. Marshall facilitated the development of an overall strategic framework and associated terms, which Rumsfeld shared with senior defense leaders, service chiefs, combatant commanders, and leading thinkers in defense policy. Retired senior officers, such as retired General Bob RisCassi, who had served on the National Defense Panel and retired Admiral Bill Owens, provided suggestions and

[505] Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.

[506] Admiral Giambastiani, who served as Rumsfeld's Senior Military Aide, recalled the number of key Defense positions that remained vacant in the early period of Rumsfeld's term: "Even though Defense is at the top of the food chain, at that time we had 44 positions that the Senate had to confirm. When I came on board, there were only 3 or 4 people confirmed." ADM(Ret) Ed Giambastiani, interview by Ryan Kendall, February 15, 2022.

edits to what became known as the "Marshall Paper."[507] Rumsfeld's DSR culminated with a presentation to President Bush in March 2001. Bush and those in attendance were receptive to the ideas in the DSR. When asked for his thoughts, Marshall emphasized the importance of experimentation and concept development in any defense reform.[508]

While the DSR was popular with the President and his cabinet, the Services were not as amenable. The Services had prepared for the QDR's long-awaited bureaucratic trench warfare. The DSR was a new process with unpredictable outcomes. Service chiefs took a personal interest, attempting to ensure that any document captured their individual Service's equities.[509] Suspicions among the Services increased as Rumsfeld set up a series of transformation working groups headed by retired general officers to study different elements of transformation. Admiral Giambastiani, Rumsfeld's Senior Military Aide, recalled the impact of these groups on the bureaucratic politics within the Pentagon: "There is this group out there who has no authority but has the sanctioning of the SECDEF. Even though he [Rumsfeld] didn't want to use these for action but just wanted to get fresh ideas, everyone thought this was Rumsfeld speaking."[510]

Congress was excited to hear the results of the much-awaited DSR to understand how the administration would approach transformation. Rumsfeld defined transformation as "the integration of technology, operational concepts, and organizational arrangements to achieve dramatic improvements in the conduct of military operations such that previous

[507] The Honorable Donald H. Rumsfeld, "Letter from Secretary Rumsfeld to Steve Cambone SUBJ: General Riscassi's Comments," April 16, 2001, Donald Rumsfeld Snowflakes Litigation Release, Third Release Bates 2967-3678, Washington Headquarters Services, Special Collections Library.
[508] Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.
[509] Jeff McKitrick, interview by Ryan Kendall, February 9, 2022.
[510] ADM(Ret) Ed Giambastiani, interview by Ryan Kendall, February 15, 2022.

approaches are rendered ineffective or obsolete."[511] He emphasized that his thoughts on the need to transform the military had not changed:

> Mr. Chairman, I have spent the past 25 years in business. Any successful executive will confirm that the safest and best time for a business to adapt is when it is on top--and the most dangerous is to wait until an innovative competitor comes along and finds a way to attack your position. Today America is strong; we face no immediate threat to our existence as a Nation or our way of life; we live in an increasingly democratic world, where our military power--working in concert with friends and allies--helps contribute to peace, stability, and growing prosperity. Indeed, it is the underpinning of world economic prosperity. But simply hanging on and simply doing more of the same could be a serious mistake.[512]

Rumsfeld indicated the DSR would provide the strategic framework and terms of reference the Department would use in its Congressionally mandated Quadrennial Defense Review.

***9/11's Impact on defense transformation***

> It didn't help that on 9/11, everything got turned upside down. That sucked the air out of most things. But having said that, nonetheless, the Secretary continued to push the Chairman and the Service chiefs to look at warfare as being different now than it was.[513] -The Honorable Stephen Cambone

For everything that the terrorist attacks of 9/11 changed, Rumsfeld's emphasis on transformation remained surprisingly consistent. The QDR process that followed the DSR ended up being truncated but still had significant impacts on the military. The Bush Administration moved away from the Two-Major Regional War construct for force sizing based on a threat-based strategy and opted for a capabilities-based strategy. Additionally, Rumsfeld published a top ten legislative priorities list out of the discussions during the QDR process. Rumsfeld demonstrated his continued emphasis on transformation even after 9/11

---

[511] Ibid.

[512] The Honorable Donald H. Rumsfeld, "Defense Strategy Review," Pub. L. No. 107–726, § Senate Armed Services (2001), https://www.govinfo.gov/content/pkg/CHRG-107shrg82316/html/CHRG-107shrg82316.htm.

[513] The Honorable Stephen A. Cambone, interview by Ryan Kendall, February 3, 2022.

by placing "Strengthen Joint Warfighting Capabilities" and "Transform the Joint Force" within his top three priorities.[514]

Rumsfeld quickly returned his public comments to his transformation agenda following the Afghanistan invasion. In a speech at the National Defense University in January 2002, Rumsfeld outlined "six transformational goals" for the Department of Defense in the aftermath of 9/11 and what the US needed to achieve them:

> To do this, we need rapidly deployable, fully integrated joint forces capable of reaching distant theaters quickly and working with our air and sea forces to strike adversaries swiftly, successfully, and with devastating effect. We need improved intelligence, long-range precision strikes, sea-based platforms to help counter the access denial capabilities of adversaries.[515]

Rumsfeld continued in his speech to make a case for why the time was right for transformation:

> Some believe that, with the US in the midst of a dangerous war on terrorism, now is not the time to transform our armed forces. I believe that quite the opposite is true. Now is precisely the time to make changes. The impetus and the urgency added by the events of September 11th powerfully make the case for action.[516]

Rumsfeld's remarks left no doubt that he would remain focused on transformation and therefore engaged with activities, such as experimentation, that supported his efforts.

### C.3 Millennium Challenge 2002: Contradictions and controversy

The combined pressures of Congress and senior defense leaders and the need to account for Service equities drove JFCOM planners to make Millennium Challenge 2002 the

---

[514] ADM(Ret) Giambastiani confirmed that the first top-ten list published shortly after September 11, 2001, was only different from the September 2002 by one priority which did not significantly impact the prioritization of transformation initiatives. The Honorable Donald H. Rumsfeld, "Memorandum for Department of Defense Leadership SUBJ: Legislative Priorities for Fiscal Year 2004," September 17, 2002.

[515] The six goals were: 1) Protect the homeland and overseas bases, 2) Project and sustain power, 3) Deny enemies sanctuary, 4) Protect information networks, 5) Use information technologies to network the join force, 6) Maintain unhindered access to space and protect space capabilities, The Honorable Donald H. Rumsfeld, "Secretary Rumsfeld Speaks on '21st Century Transformation' of U.S. Armed Forces," January 31, 2002, https://www.hsdl.org/?view&did=471878.

[516] Ibid.

largest joint military experiment in US history. For two years, J9 concept developers and experimentation planners executed a series of iterative events to set conditions for the Congressionally mandated experiment. The design process was extensive as planners struggled to find consensus on the scenario, concepts, technologies, and events associated with the experiment. In addition, the ongoing transformation debates loomed large, entangling the experiment in a more significant ideological battle to decide how the US military should fight in the future. RDO was initially focused on new command and control ideas, a small portion of the more extensive *Joint Vision* theory of victory. Still, it quickly became attached to narratives surrounding Secretary Rumsfeld's contentious transformation agenda.[517] Misperceptions surrounding the experiment's design and methodology combined with Van Riper's frustrations with previous events created a perfect storm. Van Riper's challenges and accusations regarding the experiment's credibility restrained the building momentum for change.[518]

***The process continues***

In the background of the broader defense policy discussions surrounding transformation and the Bush Administration's response to the 9/11 attacks, JFCOM had continued with its concept development and experimentation efforts. These efforts continued to build advocacy across the defense policy subsystem as J9 grew its concept

---

[517] Borger, "When 'Saddam' Won the War. If the US and Iraq Go to War, There Can Only Be One Winner, Can't There? Maybe Not. This Summer, in a Huge Rehearsal of Just Such a Conflict - and with Retired Lieutenant General Paul Van Riper Playing Saddam - the US Lost. Julian Borger Asks the Former Marine How He Did It."

[518] Print media accelerated the distribution of Van Riper's comments, creating a public relations challenge for JFCOM leadership. Mackubin Thomas Owens, "Let's Not Rig Our War Games - WSJ," *Wall Street Journal*, August 29, 2002, https://www.wsj.com/articles/SB1030585211145215475; Vince Crawley and Jill DiPasquale, "Millennium Challenge Chief Defends Exercise's Integrity," *Army Times*, September 30, 2002; Vince Crawley, "War Game Outcome Was No Done Deal, DoD Officials Say," *Army Times*, September 2, 2002; Sean Naylor, "War Games Rigged?," *Army Times*, August 16, 2002; Carl Osgood, "Was 'Millennium Challenge' War Game Fixed for U.S.?," *Executive Intelligence Review*, September 6, 2002, 68–69.

development and experimentation capabilities. J9 concept developers' work on RDO had continued in tandem with a more robust experimentation process that demonstrated J9's increasing capacity for iterative experimentation.[519] For example, Unified Vision 2001 (UV01), conducted in June 2001, was a simulation-based experiment exploring new planning processes that leveraged information technologies. The experiment strengthened the relationships between JFCOM, the Services, OSD, and Congress, setting the stage for planning Millennium Challenge 2002.

However, it also came with its challenges. Playing the Opposing Force (OPFOR) commander, Van Riper became increasingly concerned with the low level of rigor being applied to the concept development, particularly Effects Based Operations. During UV01, the US capabilities increasingly relied on assumptions about unproven technologies, resulting in a series of unrealistic engagements with enemy forces. As Van Riper and other senior mentors challenged the concepts and their assumptions during the event, he was assured the purpose was to experiment with the concepts to further their development, not validate them. During a recent interview, Van Riper recalled that a JFCOM report sent to Congress stated that UV01 had validated EBO. For Van Riper, it felt like the JFCOM planners were caving to the pressure of the bureaucracy, specifically the new administration, to produce something and avoid the challenges of an analytically rigorous process. Van Riper's experience during Unified Vision caused him to enter his preparations for Millennium Challenge feeling "a little suspicious."[520]

---

[519] From May thru December 2001, JFCOM J9 conducted four different and related experiments to include three Limited Objective Experiments (LOEs) and Unified Vision 01, a larger simulation experiment focused on the functional concepts associated with RDO, see National Research Council, *The Role of Experimentation in Building Future Naval Forces,* 112.

520 LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.

***Experimental Design***

Four factors significantly affected JFCOM's planning for Millennium Challenge. First, the Congressional requirements established who, at a minimum, had to participate in the experiment and the need for it to include live forces. This experiment would be much bigger than any previous JFCOM experiment. Due to the increased scope and sophistication of the experiment, General Kernan directed the J7, who had a more advanced simulation capability and experience in running large-scale joint training events, to partner with J9 for both planning and execution of the experiment.

Second, the Deputy J7, BG Jim Smith, led coordination efforts with the Services for the experimentation design. Service experimentation simulations reflected their own interests. For Millennium Challenge, part of BG Smiths' biggest challenges began with finding a way to integrate these different systems since each Service had an experiment that reflected their interests:

> Services… are in the business of advancing their service equities. And it starts with the models. You know, back then, the Air Sim, the Air Forces' model, did not acknowledge shootdowns by Navy aircraft. The Army's model, ARSIM, had 162 different variations of the Bradley fighting vehicle. So, you put so much information about your Service into the model that's all it focuses on.[521]

JFCOM "kludged together" more than 40 different models to ensure no one service had an advantage over another. As one J7 planner stated, "Much of the technical integration was an experiment in and of itself."[522]

These separate simulations had to reflect only one scenario while including a vast array of JFCOM and service characteristics. Millennium Challenge 2002 planners used a derivative of the Joint Staff's illustrative planning scenarios to provide the credibility and

[521] BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.
[522] COL(RET) Lawrence King, interview by Ryan Kendall, February 9, 2022.

realism required for an experiment of this scope and scale. The lead scenario developer recalled the challenges with building a common scenario to support experimentation:

> They all came, J9 concept developers, the Services, all came with their shopping lists. There were 11 major concepts, 27 joint initiatives, 46 service initiatives. But we integrated the services right off the bat. It was highly contentious at times. Services want a perfect environment for their systems to succeed, and we were going to challenge them.[523]

BG Smith relied on his professional network within the different Services from his time at National Defense University to help overcome any bureaucratic resistance. However, as Smith pointed out, sometimes resistance came from the senior levels: "One Service chief wanted me to change the experiment to satisfy his services desire, which I refused to do."[524]

Third, JFCOM had to coordinate the activities of live forces participating in the experiment. The Army initially volunteered its XVIII Airborne (ABN) Corps for the Joint Task Force Headquarters. J9 had included the Corps in its UV01 experiment the previous year and spent a significant amount of time training the staff on RDO and its supporting concepts before the experiment. However, XVIII ABN Corps had to deploy in support of Afghanistan, so the Army turned to III Corps at Fort Hood, Texas, commanded by LTG BB Bell, to serve as the Blue Joint Task Force Headquarters. Unfortunately, instead of the year of preparation that XVIII ABN Corps received, LTG Bell and his staff received the mission four months from the start of the experiment. Despite the short timeline, Bell was open to learning about RDO and clear in his understanding that he was participating in an experiment, as he stated during a recent interview: "If you hear me use the word exercise,

---

[523] Despite what some press and narrative accounts after MC02 stated, the experiment did not use an Iraq-based scenario. The scenario was a derivative of the Joint Staff's illustrative scenarios used for force sizing and took place in a fictional representation of a threat country. It was not in any way connected with CENTCOM planning efforts focused on a potential Iraq invasion such as Running Start. Jim Hutton, interview by Ryan Kendall, February 24, 2022.

[524] BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.

stop me because everybody else on the planet uses exercise or wargame or whatever they want. But this was a classic experiment."[525]

Part of Service participation included Service-focused experiments, such as the Navy's High-Speed Vessel and the Army's Stryker Interim Combat Vehicle. With each Service's experiment came challenges associated with the real-world restrictions of moving Soldiers, ships, and airplanes. Availability of forces, geography, instrumentation, and airspace all impacted the employment of live forces. Additionally, political constraints affected the Army's participation. For example, the Army had to complete its Stryker experiments within a specific window to meet a Congressional reporting requirement on the Stryker's suitability.[526] Also, many of the forces participating were actually training. MG Cash pointed out, "the Marine Corps put $50M under MC02 for training. So, they were going to get training even though they put money towards experimentation. Training was going to take the real bulk of the energy."[527] While planning around so many different constraints and conflicting interests was challenging, the more significant impacts would occur during execution.

Fourth, since RDO and its supporting concepts required a significant amount of information to facilitate decision-making and planning, the experiment required a realistic, richly detailed enemy force. JFCOM requested Van Riper to lead the OPFOR. He and his team had a year of research and preparation for the experiment with no access to information concerning the friendly (Blue) capabilities or planning. Van Riper emphasized to his team they would not use any of the EBO concepts but instead utilize more traditional

[525] GEN(R) BB Bell, interview by Ryan Kendall, February 2, 2022.
[526] BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.
[527] MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022.

planning and decision-making processes. Van Riper was impressed by the talented officers on his team and felt like they had a good plan heading into the experiment.[528]

However, not everyone had the same perspective on the role of the enemy in the experiment. Van Riper's team had conducted extensive research into US weapon systems and their vulnerabilities. He and his team understood US tactics and focused their planning on attacking what they knew to be the weaknesses. They designed their plan to win. The J9 Director, MG Cash had a different perspective: "The OPFOR was another variable. I would insert it and take it out. A significant one, but only a variable."[529] Cash envisioned an experiment where he could control the different variables, turning each like a rheostat depending on the experimental objective. In contrast, Van Riper and his team expected a lack of outside control that allowed them free rein to challenge RDO's assumptions. These differing perspectives created a tension that was built into the experiment's design, a tension that would significantly impact the experiment's execution.

***Extending the advocacy network and building expectations***

As Millennium Challenge 2002 neared execution, JFCOM began a public relations campaign to engage the media and defense policy audiences to advocate for the experiment, its concepts, and the promise of what it could produce. A series of media engagements leading up to execution emphasized the size and complexity of Millennium Challenge and connected the RDO concept to the Department of Defense's transformation goals. General Kernan described Millennium Challenge as "the largest, most complex military experiment that has ever been conducted." The experiment would include about 13,500 people stretched across the United States in nine live-force training locations and 17 simulation locations. The

[528] LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.
[529] MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022.

experiment would consist of over 32 major initiatives and had been reduced from 30,000 to 13,500 personnel due to commitments in Afghanistan.[530]

Within the same press conference, General Kernan's comments reflected the conflicting tension between an exercise focused on winning and losing versus an experiment to explore new concepts. Kernan's remarks about the Opposing force's role set the expectation that each side was out to win: "This is—we have a very, very determined OPFOR, both live and simulation. We have people who have—this is free play. The OPFOR has the ability to win here." General Kernan inadvertently set a false expectation of objectivity- winners and losers- and reinforced the behavior that Cash wanted to avoid. Those responsible for the exercise did not expect it to provide yes/no, win/lose results. Instead, those involved in the experiment would have to debate the results to draw any conclusions- the very essence of a social process.[531] As one planner stated, "the analysis of the findings in each sub-event is where the real battles should have played out."[532]

In addition to the JFCOM leadership, Secretary Rumsfeld took an active role in publicly advocating for Millennium Challenge while privately shaping the experiment to ensure it aligned with his transformation goals. Secretary Rumsfeld had been consistent in his support for experimentation. His Senate testimony made clear the importance he placed on joint experimentation: "Experimentation—particularly joint experimentation—ensures that our transformation efforts are fully integrated from inception to implementation."[533]

---

[530] "Department of Defense Special Briefing Topic: Millennium Challenge 2002 Briefer: General William F. Kernan, Commander in Chief, U.S. Joint Forces Command," July 18, 2002.

[531] Several interviewees stressed that Millennium Challenge was supposed to be an experiment, a problem-solving process that was distinct from wargames that provide an objective outcome, BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022; GEN(R) BB Bell, interview by Ryan Kendall, February 2, 2022; MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022.

[532] Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022.

[533] The Honorable Donald H. Rumsfeld, "Defense Strategy Review," Pub. L. No. 107–726, § Senate Armed Services (2001), https://www.govinfo.gov/content/pkg/CHRG-107shrg82316/html/CHRG-107shrg82316.htm.

As Millennium Challenge drew closer, Rumsfeld's sponsorship of joint experimentation expanded from just positional legitimation to his direct involvement. Rumsfeld began to give the JFCOM commander, General Kernan, more explicit guidance for the experiment's design. In a letter to Kernan in March 2002, Rumsfeld requested that General Kernan consider lessons learned from Afghanistan along with the transformation work of the Department, emphasizing that "the last thing we would want to see is a Millennium Exercise in the year 2002 that is nothing more than a collection of single Service capabilities, without real jointness and without transformation."[534] On multiple occasions, Kernan and J9 staff officers briefed Rumsfeld, providing an extensive overview of the experiment, RDO, and its associated concepts.[535]

Rumsfeld's emphasis on the importance of Millennium Challenge continued to increase leading up to the event. For example, at a press conference during Rumsfeld's visit to JFCOM, Rumsfeld described how Millennium Challenge would help transform the military:

> What this exercise or experiment is doing is it is pulling literally hundreds of people into a process where they are required to connect with each other, to talk to each other, to be interoperable, to be joint, to think joint, and to focus on goals that are not service-centric but nation-centric, combatant commander- centric, and -- as opposed to service-centric.[536]

Rumsfeld's sponsorship of Millennium Challenge brought increased attention and expectation to JFCOM's efforts. His personal interest and involvement in JFCOM's Millennium Challenge 2002 and its associated concepts created a link between his defense transformation efforts and JFCOM's experimentation. While helpful to JFCOM's efforts to

---

[534] The Honorable Donald H. Rumsfeld, "Letter to Gen Kernan Re: Millennium Challenge," March 20, 2002, Rumsfeld Library, https://library.rumsfeld.com/doclib/sp/2745/2002-03-19%20to%20Gen%20Kernan%20re%20Millennium%20Challenge.pdf.

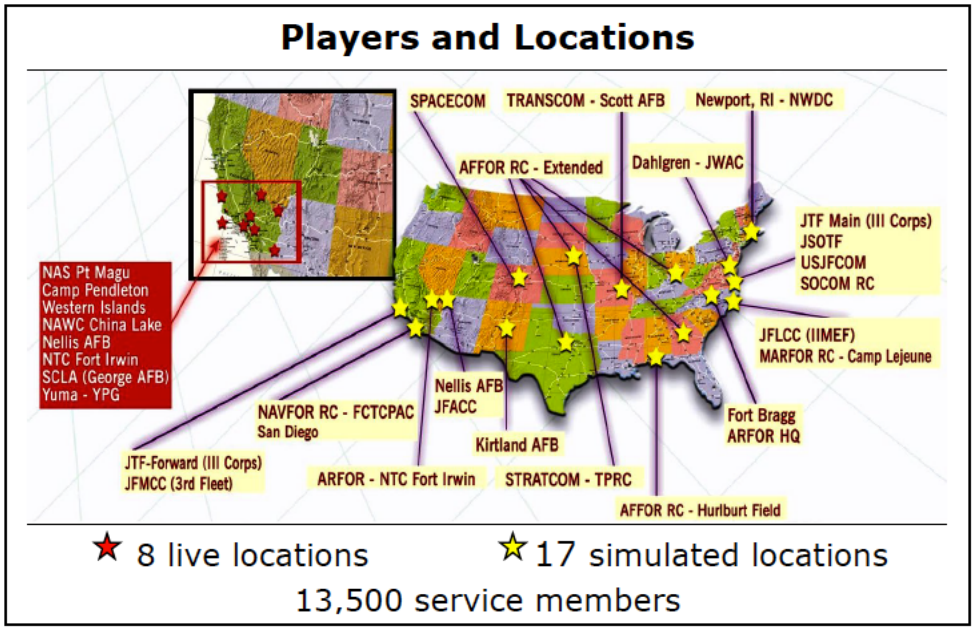
[535] Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022.

[536] The Honorable Donald H. Rumsfeld, "Press Availability with Secretary of Defense Donald Rumsfeld and Norwegian Minister of Defense Kristin Krohn Devold," July 29, 2002.

overcome institutional obstacles, this link elevated the experiment into the larger ideological struggle. What started as an experiment with a new command and control concept quickly became synonymous with all the speculation and controversy surrounding transformation. In the long run, Rumsfeld's sponsorship would prove to be detrimental as the contentious battles over transformation continued. As one JFCOM staff officer stated, "This event was to determine how joint forces would operate in the future. Therefore, it was perceived to have the potential to drive force structure, relevancy and potentially budgets. This attracted attention from all inside and outside of DoD."[537]

***Execution: Training, Wargames, and Experiments***

Figure 4.3: Millennium Challenge 2002 distributed locations[538]




[537] COL(RET) Lawrence King, interview by Ryan Kendall, February 9, 2022.
[538] "2002 Joint Experimentation Annual Report to Congress" (United States Joint Forces Command, December 1, 2002).

The expansiveness of the live, simulated, and constructed forces was impressive to those observing from the outside (see Figure 4.3 above). However, JFCOM's execution of Millennium Challenge became mired in the complexities built into the experiment. JFCOM's drive to meet the expectations of Congress, please the Services, and fulfill Rumsfeld's guidance crashed full speed into the conflicting perspectives and interests of those participating in the experiment. These factors resulted in a confluence of events that remain sources of great personal and professional conflict for those involved. Two examples from the experiment's execution highlight how the contradictions built into the experiment led to an unintended result for JFCOM.

First, early in the experiment, Van Riper and his OPFOR launched what he described as a pre-emptive attack on the US naval forces, sinking the majority of its operating fleet. Van Riper and his team designed the attack to take advantage of weaknesses in the Aegis ballistic missile defense systems and exploit what Van Riper felt was the hubris of the Blue campaign.[539] However, what they thought had happened because of their attack was not entirely realistic due to complications with the federated simulations. One of the White cell senior planners recalled: "On the game floor that morning, it was always agreed that Red would go first…Red would initiate hostilities. The Blue ships popped up in an area where you would never put a carrier battle group."[540] Additionally, the ships had maneuvered like ducks in a row within the simulation with no self-defense systems turned on.[541] As a result, the simulation created an unrealistic scenario from a naval tactics perspective that converged with an enemy course of action that catastrophically exploited

[539] Van Riper and his team had researched the capabilities of the Aegis ballistic missile defense systems and understood when they would be saturated to the point of being useless. Additionally, he launched an air attack without using voice communications. Interviews with White cell personnel suggest the planes and missiles were not detected because the ships did not have their systems on in the simulation. BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.

[540] Jim Hutton, interview by Ryan Kendall, February 24, 2022.

[541] BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.

the misstep. However, from Van Riper's perspective and that of his OPFOR team, their attack had achieved a level of success that surprised everyone, proving Van Riper's earlier assertions that JFCOM's RDO concept was flawed.[542]

Second, after the OPFOR's initial strike, the White cell began to constrain the OPFORs actions and adjudicate engagements in Blue's favor. From Van Riper's perspective, these constraints and adjudications gave Blue an unrealistic advantage. They undermined his ability as the OPFOR commander to portray a credible enemy, thereby compromising the experiment's validity. These adjudications reinforced Van Riper's suspicions that Millennium Challenge, similar to previous events, lacked the analytical rigor necessary to validate concepts. In particular, Van Riper took issue with his inability to target critical platforms such as C-130s and V-22 Ospreys. Van Riper's complaints were not without merit. It is easy to question some of the adjudication decisions, especially without the context surrounding each one, information that was not always provided to Van Riper.

However, the adjudications were not a product of JFCOM's attempts to limit the OPFORs actions to produce a favorable outcome. Instead, they were a combination of several factors within the experiment's construct. First, the federated simulation systems made automatic adjudication within the models extremely challenging, providing either conflicting or unusable data. As a result, the White cell had to adjudicate engagements every day manually.[543] Neither the OPFOR nor the Blue participants were privy to these discussions. Second, the White cell needed certain things to happen at certain times because they were real-world events. For example, as Micah Zenko's analysis points out, General Kernan had to resurrect the Blue forces in order to meet the timelines associated with the

[542] Van Riper recounted walking through the hallways after the attack, "It just stunned them. I remember walking out in there, and it's just silent." LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.
[543] Jim Hutton, interview by Ryan Kendall, February 24, 2022.

live forced entry forces taking part in the experiment at Fort Bragg, North Carolina, Fort Irwin, California, and off the coast of San Diego. [544] The tension between meeting the scripted timelines for service components and having the free-play Van Riper expected was due to the Millennium Challenge's design. The Service experiments that relied on live forces confined other events and activities associated with the joint planning experiments. Planners scripted Millennium Challenge to meet all the needs of the JFCOM and Service participants.[545]

Third, the White cell needed specific actions to stimulate the concepts JFCOM was attempting to explore. One planner recalled: "many [OPFOR] actions and geopolitical factors were highly artificial and scripted to stimulate and challenge concepts dealing with…whole of government planning…and alternative effects-based courses of action."[546] The intent was not to handcuff the OPFOR or give Blue an unrealistic advantage. In fact, as many J7 and J9 planners pointed out, the OPFOR were not the only ones operating under constraints. For example, the White cell would restrict LTG Bell's access to forces to avoid his and the staff's tendencies to operate according to previous principles of mass and kinetic force. In previous concepts, mass was a hedge against uncertainty. In Millennium Challenge, the senior mentors and White cell guided LTG Bell towards limiting mass and exploring other tools within the effects based concept to support the experiment's objectives.[547]

Once it became clear to Van Riper that he did not have free play as the OPFOR leader, he decided to remove himself from the process and instead remained an advisor to the OPFOR team. For Van Riper, without a free-thinking enemy commander, the RDO

---

[544] Micah Zenko, *Red Team: How to Succeed by Thinking like the Enemy* (New York, NY: Basic Books, 2015), 56.
[545] John Gniadek, interview by Ryan Kendall, February 16, 2022.
[546] Jim Hutton, interview by Ryan Kendall, February 24, 2022.
[547] Jim Hutton, interview by Ryan Kendall, February 24, 2022; BG(R) Jim Smith, interview by Ryan Kendall, February 14, 2022.

concept's assumptions would continue to go unchallenged. For the remainder of Millennium Challenge, Van Riper compiled a report outlining his observations, including internal JFCOM emails. He delivered copies of his report to the general officers who attended the after-action review. Van Riper recalled that even though neither he nor his OPFOR team had an official presentation as part of the after-action review, General Kernan did give him the opportunity to speak. Van Riper informed him, "Everything I have to say is in that report I have just given you."[548] Van Riper's report, which subsequently was classified, was never released by JFCOM.

### C.4 The Credibility fallout

> I got tipped off to it, and somehow, I got Van Riper on the phone. He didn't sugarcoat it at all.[549] – Sean Naylor, former Army Times reporter

Van Riper recalled the after-action review taking place in the morning. That evening, he began receiving phone calls from the media. The first phone call came from Army Times reporter Sean Naylor, whose August 2002 story, "War Games Rigged?" was quickly captured by media outlets from around the world. Van Riper remembered the reaction after the Army Times story: "I'd have 20 to 30 phone calls a day. I was getting them from Scandinavian countries, all over the world getting these calls." [550]

Sean Naylor's opening line became the foundation of a narrative that has hung over Millennium Challenge ever since:

> The most elaborate war game the US military has ever held was rigged so that it appeared to validate the modern, joint-service warfighting concepts it was supposed to be testing, according to the retired Marine lieutenant general who commanded the game's Opposing Force.[551]

---

[548] No interviewees for this project remember having seen the report or confirmed they had read it. LtGen (Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.
[549] Sean Naylor, interview by Ryan Kendall, January 14, 2022.
[550] LtGen (Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022.
[551] Sean Naylor, "War Games Rigged?" *Army Times*, August 16, 2002.

The article immediately made the credibility of Millennium Challenge and JFCOM open to debate in the court of public opinion. Early attempts by JFCOM leadership failed to regain the initiative or to quieten the allegations regarding the experiment's validity. Senior leaders, including the Vice Chairman of the Joint Chiefs, General Peter Pace, attempted to defend the experiment and reassure everyone the experiment was not rigged.[552] Kernan and Cash, during their press conference, discussed the challenges with the experiment's design and the nuances of its modeling and simulations, all of which failed to do anything except strengthen Van Riper's narrative.[553]

Interviews with the JFCOM participants reflected the impact of Van Riper's comments on the experiment's outcome within the command. MG Cash, the J9 Director, commented, "General Van Riper became the [after action review] of Millennium Challenge. His influence overwhelmed Millennium Challenge halfway through."[554] The public discussion that ensued following the experiment was professionally offensive to those who had worked for almost two years to bring Millennium Challenge together, yet they were unable to respond. Any response was restricted to the JFCOM leadership and public affairs team. A lead J9 planner recalled, "we had to listen to all of this and as the story metastasized more about the game being fixed, but none of us could say anything."[555]

### D. EXPERIMENTATION OUTPUTS

Van Riper's public comments immediately thrust the experiment into the political discussions surrounding transformation and potential future US actions in Iraq. Millennium Challenge became entangled with existing narratives surrounding Secretary Rumsfeld and his

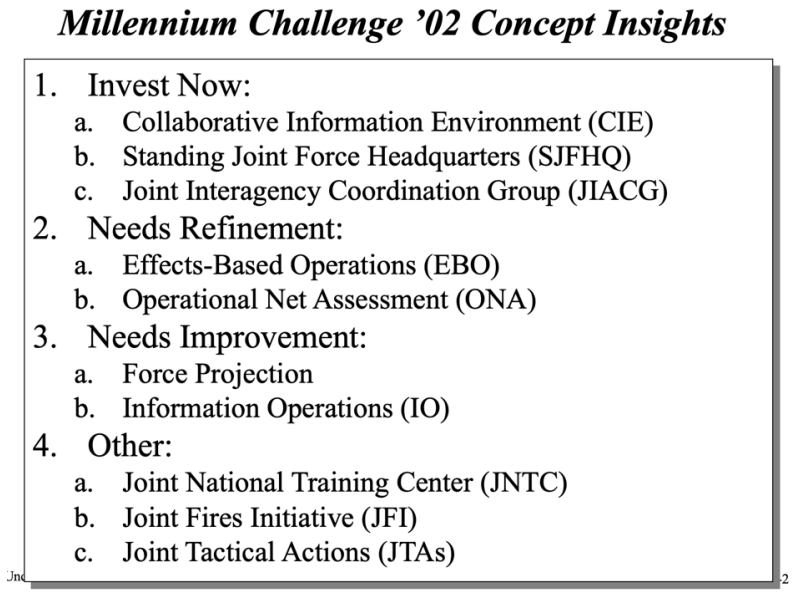
552 "US DoD News Briefing- Part 1 of 2," *M2 Presswire*, August 21, 2002.
553 "Millennium Challenge Chief Defends Exercise's Integrity," n.d., 5.
554 MG(R) Dean W. Cash, interview by Ryan Kendall, February 4, 2022.
555 Jim Hutton, interview by Ryan Kendall, February 24, 2022.

transformation efforts.[556] The Van Riper narrative successfully restrained the building policy momentum, damaged the advocacy network associated with joint experimentation, and prevented the burgeoning RMA-Optimists from gaining strength as the ideological battle over future US military power continued into the Iraq war. Van Riper's narrative supported the RMA-Skeptics' belief that advanced technologies cannot subjugate war's uncertainty to the point where any force could have the capabilities the Joint Vision posited. This struggle between these two loose communities continues today to the detriment of finding a solution.

556 Julian Borger highlighted the association of MC 2002 with Rumsfeld's transformation efforts, "The question of transformation and the usefulness of concepts such as RDO are the subject of an intense battle within the Pentagon, in which the uniformed old guard are frequently at odds with radical civilian strategists of the kind Rumsfeld brought into the Pentagon." Julian Borger, "When 'Saddam' Won the War. If the US and Iraq Go to War, There Can Only Be One Winner, Can't There? Maybe Not. This Summer, in a Huge Rehearsal of Just Such a Conflict - and with Retired Lieutenant General Paul Van Riper Playing Saddam - the US Lost. Julian Borger Asks the Former Marine How He Did It," *The Irish Times*, September 14, 2002, City edition, sec. WEEKEND.

**D.1 Social Consensus**

Figure 4.4: J9's Millennium Challenge Insights presented to the Joint Requirements Oversight Council, October 21, 2002[557]




Millennium Challenge failed to build social consensus around RDO or its supporting concepts such as Effects Based Operations and Operational Net Assessment. It did, however, convince senior leaders that the Standing Joint Task Force Headquarters was a key concept for future joint operations. Millennium Challenge led J9 to recommend investment in new initiatives while also stopping short of adopting others (see Figure 4.3 above). However, the lasting impact was not the value of the SJTFHQ and other command and control initiatives, or the lessons learned that came from using Effects Based Operations and Operational Net Assessment. The lasting impact was Van Riper's narrative. Van Riper did

[557] COL Tata, "Joint Experimentation JROC Brief" (Joint Requirements Oversight Council, The Pentagon, October 21, 2002).

not intend for his narrative to impact just JFCOM. Instead, he used Millennium Challenge to win the broader ideological struggle that would define how future US forces would fight.

As the lead J9 concept developer pointed out, JFCOM did not intend Millennium Challenge to transform the military immediately or change the way services fought. Instead, it intended to explore new planning and command and control concepts.[558] However, given the expectations, the amount of attention, and Secretary Rumsfeld's transformation agenda, Millennium Challenge could not be viewed with that level of nuance. Van Riper's actions and comments indicate he understood the more significant political battle taking place and understood the policy momentum that was building. However, it is evident in this case study the experiment itself became bundled with the political forces within the defense policy subsystem. Millennium Challenge provided an opportunity for Van Riper to end, or at least decrease, the momentum before it was too late.

### D.2 Strengthening the Advocacy Network

Joint Forces Command's advocacy network was reduced in size and strength due to Millennium Challenge. Most of all, Congressional members who had been supportive began to question JFCOM's activities. For example, Admiral Giambastiani's testimony before the Senate Armed Services Subcommittee on Emerging Threats included a series of questions requesting that Giambastiani provide the Millennium Challenge chronology of events, its impacts on future programs, and the willingness of JFCOM to design experiments that had an increased probability of failure.[559]

---

[558] Dr. Kevin Woods, interview by Ryan Kendall, February 21, 2022.
[559] Arthur Cebrowski and ADM Ed Giambastiani, "Department of Defense Authorization for Appropriations for Fiscal Year 2004," § Armed Services (2003), https://www.govinfo.gov/content/pkg/CHRG-108shrg87327/html/CHRG-108shrg87327.htm.

Additionally, as the policy discussion turned towards a US policy towards Iraq, Congressional members brought up Van Riper's asymmetric attack as a harbinger of future US operations. During a Senate hearing with General Myers, the CJCS, and Secretary Rumsfeld, Senator Roberts recounted Van Riper's story and followed with a series of questions about the US preparedness for asymmetric attacks. Within Roberts' line of questioning, he compared Van Riper's tactics to those the US faced in Somali in 1993. Roberts, who had been a proponent of Millennium Challenge, was no longer the optimistic advocate. Instead, he voiced concerns that Millennium Challenge was an example of overconfidence in high-end technologies that exposed US forces to increased risk. One exchange demonstrates the challenges senior leaders faced in overcoming Van Riper's impact on the advocacy network for issues beyond experimentation and transformation. Instead of talking about things for which they needed support, senior leaders had to answer for Van Riper's comments:

> SEN. ROBERTS: The JFCOM or the Joint Forces Command has done no analysis on why the Red Team has had such great success. I know they will. I know they'll report it to the secretary. But I am concerned about this in regard to American war-fighters. Where are we on this?
> GEN. MYERS: Well, Senator Roberts, I have a great deal of respect for General Van Riper. I happened to go to a joint war-fighting course with him, as a matter of fact, a few years back.
> SEN. ROBERTS: Yeah, he spoke very highly of you when he came into my office.
> GEN. MYERS: And so I hold him in respect, but -- and not to dwell on the Millennium Challenge piece of this, but it was an experiment where sometimes things had to be reset to try to figure out and achieve the objectives we wanted to do.
> SEN. ROBERTS: But the war on Iraq, General, is not going to be an experiment.
> GEN. MYERS: I understand.[560]

General Myers eventually deflected Senator Roberts' criticisms, assuring him that military planning accounted for the tactics Van Riper exploited during the experiment. Whether

[560] "Hearing of the Senate Armed Services Committee, Subject: U.S. Policy toward Iraq," § Armed Services (2002).

Myers was able to address Senator Roberts concerns is unknown. However, this example points to the negative impact of Millennium Challenge on the previously strong advocacy network. Senior defense officials had to respond to Van Riper's narrative at the expense of furthering their own.

### D.3 New Communities of Practice

Millennium Challenge did not solidify the RMA-Optimists as a more easily defined military community of practice. In fact, the narrative that Millennium Challenge generated supported the RMA-Skeptics' belief that advanced technologies cannot subjugate war's uncertainty and chance to the point where any force could have the capabilities associated with the *Joint Vision* documents.

This struggle between these two loose communities continues today to the detriment of finding a solution. RMA-Optimists fail to account for the limitations of emerging technologies, while RMA-Skeptics are reluctant to imagine their possibilities. Unfortunately, the failure of one group to emerge over another limits access to potential solutions. Many of the ideas that Millennium Challenge explored, such as information sharing, nonlinear planning processes, and data fusion centers, are acceptable today as possible future capabilities. However, the normalization of those ideas has taken almost twenty years and two wars.

## III. Conclusions

The above analysis of JFCOM's joint experimentation concluding with Millennium Challenge 2002 demonstrates the role that experimentation plays within an ideological competition to decide how a military fights in the future. As part of this competition, experimentation provided an opportunity to bring communities together to build consensus

around ideas. However, it also allowed opposing communities to stall an innovation effort, restrain its momentum, and prevent it from transitioning to implementation. This evidence aligns with the description of experimentation as a social process.

While it is not surprising that the experimentation process can restrain an innovation if it is not sufficiently developed, the fallout from Van Riper's comments limited the opportunity for any future experimentation to revisit the ideas. ADM(R) Giambastiani, who assumed command of JFCOM following Millennium Challenge, stated that "Millennium Challenge had so many vociferous critics it made it useless."[561] Instead of returning to the future-oriented concepts like RDO, Giambastiani instead focused on near-term issues that "made someone else successful." This evidence suggests experiments must be designed to facilitate the social process of constructing knowledge. Millennium Challenge grew into a series of linked events rather than one experiment, and its size and momentum closed off any opportunity for this to happen.

In addition to the design of Millennium Challenge, there are two other alternative explanations as to why the causal mechanism did not produce the expected outcome. One alternative explanation is that JFCOM planners failed to convince people that the concept matched the security environment. One of JFCOM's challenges was to define when in the future the experiment would take place. JFCOM concept designers had created RDO with 2010 technologies in mind. However, the experiment's scenario timeline crept forward to 2007. This did not prevent JFCOM planners and Service representatives from incorporating technologies based on the original planning horizon. Additionally, these technologies, such as the Marine Corps' Osprey, were programs of record with significant budget and political interests. Therefore, any decision to challenge the assumptions associated with those platforms would come with considerable risk.

[561] ADM(Ret) Ed Giambastiani, interview by Ryan Kendall, February 15, 2022

However, for the RMA-skeptics like Van Riper, the over-emphasis on technology was not just a future problem. Due to the demands of the strategic environment after 9/11, the overreliance on technology presented significant problems in the present. Furthermore, the unchallenged assumptions in the experiment were an indicator that the future-based concepts had the potential of being rushed into production rather than being part of a long-term development process. The fear of this happening drove Van Riper to challenge the experiment.[562] Therefore, the issue was not that the experiment did not reflect the current strategic environment. Instead, it was that senior leaders might use the RDO concept even though it relied on immature technologies and assumptions that required further experimentation.

This explains why Van Riper publicly attacked the experiment, but not why the experimentation process and its advocacy network did not withstand his criticisms. Another alternative explanation is that the externally driven experimentation process lacked an advocacy network with sufficiently deep roots inside the Services and thus became more susceptible to derailment. As previously discussed, JFCOM made significant efforts to accommodate Service interests within the experiment. However, rather than an indicator that the Services supported experimentation, it was more likely a sign they tolerated it. A former JFCOM Commander stated, "The concepts were very well received when they confirmed what the services were already doing. They were not well received when they did not confirm what the services were doing."[563] This suggests the same applied to experimentation. The advocacy network proved to be brittle in the face of a forceful counter-narrative, unable to withstand public scrutiny. Although there is no evidence to

---

[562] Van Riper discussed these concerns shortly after the experiment and in an interview with the author, LtGen(Ret) Paul Van Riper, interview by Ryan Kendall, January 27, 2022; Sean Naylor, "War Games Rigged?," *Army Times*, August 16, 2002.

[563] ADM(Ret) Ed Giambastiani, interview by Ryan Kendall, February 15, 2022.

suggest that Congress stopped supporting JFCOM and its experimentation efforts, as the above testimony shows, there is evidence to suggest Congress stopped advocating for it.

Senior leader sponsorship was necessary but not sufficient in this case, and it came from different sources compared with the Service experimentation cases. In joint experimentation, Congressional members and civilian defense officials played a more significant role in sponsoring experimentation than in previous Service examples. Outside the Services, power is more diffuse, and the interests are more entrenched. As a result, senior leaders face greater challenges in building consensus around a theory of victory or a change agenda. As demonstrated in this case, even a coalition of Congress and the Secretary of Defense faced significant resistance. This suggests the increased importance of advocacy networks that diffuse and legitimize ideas within multiple communities to overcome political and bureaucratic obstacles.

Experimentation plays a critical role in this broader effort. It provides the setting where the substantive debates that build consensus among the Service communities should occur. Most importantly, for this process to generate consensus, it should have consistent engagement from Service leaders who are intellectually invested in the process. This legitimizes the process and enables experimentation to drive the theory of victory further down into the Services, increasing the resilience of the advocacy network and enabling it to withstand the public scrutiny that comes with joint service innovation. Unfortunately, Millennium Challenge and JFCOM's joint experimentation did not benefit from a sufficiently resilient advocacy network for all the reasons described above. For the most part, Service leaders remained interested in their theories of victory rather than the concepts coming from JFCOM. Without them championing both the ideas and experimentation, the advocacy network could not provide the necessary support.

### A. THE STRENGTH OF THE NARRATIVE

The power of Lieutenant General Van Riper's narrative was one of the more unexpected elements of this case. In addition to the different publications that carried a version of Van Riper's story immediately after Millennium Challenge, his narrative was also a key part of best-selling books like Malcolm Gladwell's *Blink*, published in 2005, and Micah Zenko's *Red Team,* published in 2015. The narrative has made a resurgence in defense policy publications due to the recent increase in experimentation activity and discussions about joint experimentation. The story has even shown up in Reddit communities, where participants debate his story and search for supporting evidence.[564] As Micah Zenko concluded, Millennium Challenge has become "a shorthand reference for denigrating the cutting-edge and unrealistic notions of military transformation that characterized the Rumsfeld era."[565] Why has this narrative become so hard to change? This case demonstrates the challenges associated with defense policy reform. In these cases, "Politics" play an outsized role. The challenge for those studying public policy is understanding how these forces interact and shape outcomes over time. This case has demonstrated that defense innovation and experimentation are not free from this challenge. Future research examining experimentation and innovation must pay closer attention to these considerations.

### B. THE ROLE OF CONGRESS IN EXPERIMENTATION

Congress has played a significant part in each of the two previous case studies. However, Congress and specific members played a dominant role in starting experimentation and spurring innovation efforts in this case. Given their limited time, resources, and ability to influence the Department of Defense, what role can they play to

---

564 "So What Is the Deal with Millennium Challenge 2002 Wargame?," *R/War College* (blog), February 1, 2021, https://www.reddit.com/r/WarCollege/comments/la7elp/so_what_is_the_deal_with_millennium_challenge/
565 Micah Zenko, *Red Team: How to Succeed by Thinking like the Enemy* (New York, NY: Basic Books, 2015), 61.

support innovation? This case demonstrates that a small cohort of bi-partisan and bi-cameral individuals can have a significant impact. Senators Coats, Lieberman, and Roberts, and Representative Thornberry, among others, actively pursued measures to drive the Department of Defense and the Services toward the ideals of Goldwater-Nichols. However, similar to the sponsorship of Secretary Rumsfeld, the Congressionally mandated joint experiment forced JFCOM to do something it was unable to do. During an interview with Representative Thornberry, he reflected on how Congress discourages innovation:

> The first thing that jumps to my mind is, I think a lot of the reluctance to change, whether it's experimentation or whatever, is based on a fear of getting hauled in front of a congressional committee and berated by that failure.[566]

The Congressional pressure that the JFCOM planners felt came up consistently in interviews. To Rep. Thornberry's point, the mid-level officers doing the experimentation work need to feel less pressure and more support when they fail. This feeling often will not come from their organization, but it can be a role for Congress in the future. As Rep. Thornberry stated:

> I played with having a hearing where people, program managers, would be brought to testify publicly when their program crashed and burned. But if they did it well and learned something from it, we need to have a greater tolerance for the learning that comes from failure and failing early.[567]

This case demonstrates the impact that Congress can have to initiate experimentation and innovation efforts within the joint force. As Senator Lieberman noted in a recent interview, "Congress, including the Armed services committees and the appropriation committees, have a real opportunity to exert real policy leverage to drive changes in the Pentagon if they want to use it."[568] While the joint experimentation process

---

[566] The Honorable Mac Thornberry, interview by Ryan Kendall, February 15, 2022.
[567] Ibid.
[568] The Honorable Joseph Lieberman, interview by Ryan Kendall, April 5, 2022.

did not lead to an innovation transitioning to implementation, this case highlights that Congress plays an increasingly important role in joint experimentation and innovation compared with Service experimentation. Therefore, any joint experimentation effort should include efforts by senior defense leaders to connect the advocacy network to Congress early in the process to facilitate the initiation and sustainment of the joint experimentation process.

# CHAPTER FIVE: CONCLUSION

> Experiment is a respected but neglected activity.
>
> Gooding, Pinch, and Schaffer, *The Uses of Experiment*[569]

> …short of war there is no method for testing a solution. The decision will be based largely on opinion, and opinions will vary.
>
> General George C. Marshall[570]

This dissertation examined how defense policymakers can use experimentation to support the peacetime military innovation process by answering the question, under what circumstances does military experimentation support the transition of an innovation to implementation during peacetime? This concluding chapter first summarizes the dissertation's main findings and identifies its contributions to the existing scholarly literature. It continues with a review of the project's scope conditions and limitations, including a brief review of additional cases to examine the exportability of the findings. Next, this chapter discusses the policy implications of this dissertation for defense policy and scholarship. Finally, it offers suggestions for future research.

## I. Findings and Contributions

### A. MAIN FINDINGS

Within the cases examined in this dissertation, I found that peacetime military experimentation is *a social process within which organizations, groups, and actors influence the ideological competition within a defense policy subsystem*. Each case demonstrated how military experimentation provides a forum within which communities build consensus around a

---

[569] David Gooding, Trevor Pinch, and Simon Schaffer, eds., *The Uses of Experiment: Studies in the Natural Sciences* (Cambridge, UK: Cambridge University Press, 1989), xiii.

[570] General George C. Marshall as quoted by General Meyer during a speech in May 1980. General Meyer attributed the quote to Marshall's remarks before the Air Corps Tactical School in 1938. Meyer, *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983*, 94.

theory of victory, generate new methods and measures of success, and convince critical constituencies that the innovation is both necessary and the right choice. In the 9th ID motorized experiments, the experimentation process led to internal consensus around a theory of victory among those charged with experimentation. Experimentation planners and participants from different communities formed ad-hoc teams that explored new tactics, equipment, and organizational designs. These shared experiences resulted in an internal consensus that manifested in a shared identity within the experimental forces. Although this consensus did not expand beyond those involved with the experiments, the case nonetheless demonstrated how experimentation was more than a process to discover new empirical information. Instead, it highlighted the challenges associated with the social dynamics of the experimentation process.

The New Louisiana Maneuvers and Force XXI experiments provided a case where consensus expanded beyond those directly involved with experimentation. Senior leader engagement and debate regarding experimentation formed the backbone of these efforts because Sullivan and Reimer constructed them into the decision-making process. In most cases, senior leaders acknowledged that a Board of Directors' decision represented one voice for the Army leadership, and therefore kept their organizations and associated personnel in alignment. This alignment supported the comprehensive communications plan integrated into both series of experiments, helping to both create excitement and inform leaders throughout the policy subsystem how the Army was changing. As experimentation continued, it exposed those at lower echelons within the Army to new ideas and empowered them to participate in shaping the future Army, further building consensus around both experimentation and the new theory of victory.

In the Joint Forces Command (JFCOM) case, experimentation brought the ideological competition between the RMA-optimists and RMA-skeptics into the public eye.

The varied interests of the different organizations, groups, and actors shaped the experimentation process, crowding out the consensus-building efforts required to advance the theory of victory. While the JFCOM joint experimentation process was unsuccessful in generating consensus, it demonstrated that experimentation is more than activities that produce empirical data. Instead, experimentation involves narratives and counter-narratives as different communities compete to define how a military will fight.

Additionally, in each case, *senior leader sponsorship was necessary but insufficient*. The experimentation process required senior leader sponsorship to allocate resources and bureaucratic support. Even though military organizations are hierarchical, no one senior leader held sufficient power to drive the experimentation process. General Meyer envisioned his sponsorship as part of a top-down-bottom-up approach with the 9th ID that would result in a light division that fought like a heavy division. However, unlike the 11th Air Assault Division, which served as his historical analog, Meyer did not have the requisite support from key organizations and their leaders.

Additionally, this case highlighted the potential impacts of variance in senior leader sponsorship. Meyer's successor, General Wickham, supported the 9th ID's efforts with funding and bureaucratic support associated with acquisition programs for equipment essential to the concept. However, Wickham also offered a less disruptive alternative in the 10K division. This case suggests that high senior leader sponsorship must include a personal passion for innovation beyond bureaucratic top cover.

In contrast to the 9th ID, the New Louisiana Maneuvers and Force XXI case demonstrated how the continuity in sponsorship from two intellectually engaged and passionate senior leaders, Sullivan and Reimer, facilitated the longevity of the experimentation process. Each leader developed institutional processes to build consensus using the experimentation process while carefully distributing the resources required for

experimentation. Nonetheless, experimentation could not generate agreement without additional support, even with their significant sponsorship. Each leader faced resistance from communities that challenged the limits of their formal authorities, such as retired senior officers.

The JFCOM case introduced different forms of senior leader sponsorship, including Congress and the Secretary of Defense. Armed with a mandate for change from both Congress and the President, Secretary Rumsfeld possessed a significant amount of formal and informal authority. However, even his sponsorship was not enough to overcome the variety of power sources within the defense policy subsystem. In addition, members of Congress, who leading up to Millennium Challenge had successfully shaped joint experimentation, discovered the limits of their influence as Millennium Challenge failed to produce the results they wanted. The JFCOM case suggested that because joint experimentation can lead to budgetary decisions with significant long-term impacts for larger communities, even senior leader sponsorship from the Secretary of Defense and Congress is insufficient for the experimentation process to support innovation. This suggests the increased importance of advocacy networks that diffuse and legitimize ideas within multiple communities to overcome political and bureaucratic obstacles.

Finally, within the first two cases, *the increased size and strength of an advocacy network was associated with a higher probability of moving from experimentation to implementation.* During the New Louisiana Maneuvers and Force XXI experiments, Sullivan and Reimer cultivated an extensive advocacy network, leveraging organizations, such as the Association of the United States Army (AUSA), to communicate the experimentation process to external audiences. The New Louisiana Task Force developed connections with key industry leaders, opening access to new sources of expertise and technologies that supported experimentation. Reimer continued to extend the advocacy network down into the Army, inculcating mid-level

leaders within the Experimental Force into an emerging community of practice centered on integrating digital technologies across a force projection Army. The advocacy network exported the experimentation process to key constituencies, such as Congress and the Department of Defense, distributing the rhetoric that persuaded those external to experimentation to support its ideas. Like the 11th Air Assault Division that provided a living example of the Howze Board's airmobile concept, the 4th ID provided the prototype that the Army would rapidly scale up as the war in Iraq approached.

In contrast, the lack of a strong advocacy network decreased the probability of the 9th ID's motorized concept transitioning from experimentation to implementation. The experimentation process built consensus within those participating directly, but without an advocacy network of sufficient size and strength, it could not persuade those external to the process. The lack of support from organizations such as TRADOC and FORSCOM stymied advocacy network building efforts of the Division leadership and the Chief of Staff, leaving the 9th ID's concept isolated from much of the defense policy subsystem. This case highlighted the importance of an advocacy network during the experimentation process and the difficulty of using experimentation to build consensus among those who do not experience the experiments firsthand.

As a deviant case, JFCOM joint experimentation failed to support a transition to implementation despite an initially strong advocacy network. The evidence in this case suggests an alternative explanation. In the JFCOM case, the externally driven experimentation process lacked an advocacy network with sufficiently deep roots inside the Services and thus became more susceptible to derailment. JFCOM made significant efforts to accommodate Service interests within the experiment. However, rather than an indicator that the Services supported experimentation, it was more likely a sign they tolerated it. The advocacy network proved to be brittle in the face of Van Riper's forceful counter-narrative,

unable to withstand public scrutiny. Although the analysis found no evidence to suggest that Congress stopped supporting JFCOM and its experimentation efforts, there was evidence to suggest Congress stopped advocating for it.

With so many senior leaders and key policymaking organizations included in the advocacy network, it would make sense for the experimentation process to have a high probability of transitioning from experimentation to implementation. Although the advocacy network included all these senior leaders, the experimentation process became interrupted after Millennium Challenge as public scrutiny took hold and political forces took over. This interruption prevented leaders from extending the network down and into the Services, garnering support for the Rapid Decisive Operations concept. This evidence suggests that due to the highly politicized environment of joint innovation, joint experimentation should initially occur at a much smaller scale, building an advocacy network that connects key representatives from the Services with the process. Additionally, senior leaders should restrain their efforts to spotlight the value of experimentation. Instead, senior leaders should prioritize providing top cover to increase the probability that experimentation can refine its ideas free from the scrutiny of increased public expectations.

Next, the framework for examining military experimentation during peacetime proved to be a valuable tool for analyzing the experimentation process. The framework provided a consistent analytical frame for each case that examined the experimentation process's inputs, characteristics, and outputs. In addition to helping research describe what is happening during experimentation, this military experimentation framework facilitated the analysis of additional explanatory variables, such as advocacy networks, throughout the process. The framework provides an analytical template for experimentation that thus far has been missing from the literature.

This dissertation offers two additional findings not related to its original arguments. First, researching each case study highlighted the lack of a systematic effort to learn about military experimentation within the organizations that will conduct experimentation in the future. For example, within the Army, there has been little effort to understand how experimentation supported innovation in the past. For instance, General Sullivan sponsored Yarrison's historiography of the New Louisiana Maneuvers, but no equivalent effort exists for the Force XXI experiments. In the case of the 9th ID, two historiographies exist, but each does little to help a policymaker understand how experimentation supports innovation efforts.

For Millennium Challenge, the situation is even less helpful for policymakers. The majority of interviewees commented that no one had interviewed them before regarding the experiment, including some of the key leaders. The accounts of Millennium Challenge had been, to this point, limited to defense news articles and the writings of Malcolm Gladwell and Micah Zenko. Their accounts are helpful, but they are also extremely limited and do not capture the complexities associated with the entire experimentation process. The increased emphasis on joint experimentation has resurrected interest in Millennium Challenge, which has rejuvenated Van Riper's narrative surrounding it. As the US military turns towards joint experiments, those charged with leading experimentation would benefit from insights that additional research could provide.

The second additional finding of this dissertation is the importance of leadership within the experimentation process. This finding goes beyond the senior leader sponsorship associated with previous discussions. Regardless of the degree to which experimentation supported innovation, leaders at levels throughout the organizations involved played critical roles in translating the ideas and guidance of their senior leaders into action. The 9th ID and the 4th ID benefitted from some of the most talented Army leaders of their times. Division

commanders, Brigade commanders, and Senior Non-Commissioned officers in each case provided the connective tissue between the senior leaders who initiated the experimentation process and the leaders who had to do the work. Experimentation is not easy. It requires those involved to take on tasks for which they are not trained and tasks that have no instructions on how to perform them. The research of these cases indicates that experimentation requires a significant level of dedication, something that does not happen without strong leaders throughout an organization.

## B. PROJECT CONTRIBUTIONS

This dissertation contributes to existing scholarship in four ways. First, this dissertation offers an original examination of peacetime military experimentation as a social process. Unlike previous scholarship that associates experimentation with a learning process that generates empirical data supporting an innovation, this dissertation presents evidence that experimentation's importance requires a different perspective. Empirical data plays a role, but it is not the defining factor. Experimentation's value is as a forum within which different communities interact to socially construct new knowledge and build consensus around an innovation and new metrics of success. This evidence connects existing research within the field of sociology of science and technology with the military innovation studies field.

Second, this dissertation contributes a focused examination of the military experimentation process during peacetime. The only other such works focused on military experimentation have focused on how military services have conducted experiments and the associated best practices, but few, if any, have studied how the experimentation process supports military innovation.

Third, this dissertation contributes three new case studies to the universe of cases associated with military innovation studies. The 9th ID and JFCOM's joint experimentation have yet to be examined within the military innovation studies literature. At the same time, Jensen's case on the Army's New Louisiana Maneuvers and Force XXI focused on doctrinal reform rather than the experimentation process. Additionally, this dissertation benefitted from more than 70 interviews with individuals from various perspectives within the defense policy subsystem. For example, the Force XXI case included interviews with military leaders from the platoon level to the Secretary of Defense and external groups such as the media, think tanks, and Congressional staffers. The addition of these cases also helps address the oversampling of success cases within the field. Studying cases where leaders attempted to innovate but fail offers new insights missing from previous research that favors successful innovation cases.

Fourth, this dissertation provides a framework for peacetime military experimentation aligned with Horowitz and Pindyck's recently published research. The framework helps align analytical models while also introducing new concepts that offer a more nuanced understanding how experimentation supports the innovation process.

## II. Scope Conditions and Limitations

### A. Scope Conditions

This dissertation's arguments centered on US military experimentation during peacetime in three separate case studies. These cases are a small sample from a broader universe of cases and provide some of the first research centered on the military experimentation process. The methods and evidence presented in this dissertation strengthen the findings' internal validity associated with each case. However, the external validity of the findings and associated inferences remains limited. A complex social process

like military experimentation requires further examination of this dissertation's findings in other cases to better understand their generalizability.

A brief examination of three cases from the universe of cases outlined in Chapter 1 suggests this dissertation's findings have broader application within the scope conditions. The following discussion applies the findings to the Army's Air mobility experiments, the Navy's UPTIDE experiments, and the Assault Breaker experiments.[571]

Each case involved a social process of consensus building and refinement as groups shaped both the experiments and resultant innovations. These experiments included debates over scenarios, the representation of threats, and assumptions regarding technologies and their future effectiveness. Groups external to the military services, such as industry, academia, and the press, each played roles in the experimentation process. In the Air Mobility experiments, Howze's relationships with the defense industry helped identify possible technical solutions to the challenges of air mobile operations. Additionally, UPTIDE benefited from scientific research regarding sonar technologies, and the Assault Breaker experiments relied on DARPA's extensive network of scientists and engineers. Furthermore, the Air Mobility and UPTIDE experiments each came under attack from competing actors and organizations. For example, Commanders in the Navy Fleets external to the Antisubmarine Warfare Command criticized the UPTIDE experiments' results,

[571] Summaries that outline the evidence within this section for each case are provided in three separate sources, Howze describes the Air Mobility experiments and provides evidence that demonstrates the social process of experimentation as outlined in Chapter 1 of this dissertation, Hamilton H. Howze, *A Cavalryman's Story: Memoirs of a Twentieth-Century Army General* (Washington, D.C: Smithsonian Institution Press, 1996); Angevine provides an overview of the UPTIDE experiments and role of senior leader sponsorship and the advocacy network that experiment leaders built to connect their ideas with senior leaders, Robert G Angevine, "Innovation and Experimentation in the US Navy: The UPTIDE Antisubmarine Warfare Experiments, 1969–72," *Journal of Strategic Studies* 28, no. 1 (February 2005); Van Atta offers one of the few scholarly accounts of Assault Breaker, and this section benefits from the evidence he presents, Richard H. Van Atta, Sidney G. Reed, and Seymour J. Deitchman, "DARPA Technical Accomplishments. Volume 2. An Historical Review of Selected DARPA Projects" (Fort Belvoir, VA: Defense Technical Information Center, April 1, 1991), https://doi.org/10.21236/ADA241725.

claiming the results did not reflect "the true story of SQS-26 sonar in current fleet operations."[572]

In each of these three cases, senior leaders sponsored experimentation, providing legitimacy and bureaucratic resources that allowed leaders to explore a new theory of victory. For example, in the Air Mobility case, the Secretary of Defense sponsored experimentation in support of a new air mobile infantry concept; senior Naval officers sponsored the UPTIDE experiments to examine new anti-submarine warfare concepts; and Under Secretary Perry sponsored the Assault Breaker experiment to study DARPA's Integrated Target Acquisition and Strike System (ITASS) concept.

While some of the characteristics of these three experiments were similar, they varied in their transition to implementation. The UPTIDE and Air Mobility experiments resulted in a shared consensus around their respective concepts, a strengthened advocacy network, and in the case of the air mobile concept, a new community of practice. In contrast, the Assault Breaker experiment was not as successful in its transition to implementation, with only portions of the concept finding their way into the military services. Former Deputy Secretary of Defense Bob Work suggested in a recent interview that the failure to build consensus despite the concept's success during the experiment came down to social factors within the Navy and Air Force. For example, the Navy's aviator culture idolized pilots that could strike targets with dumb bombs. Precision bombs went against one of the community's conventions. It was not until the Gulf War that these social factors became negligible as the effects of precision weapons and sensors proved to be significant. [573]

Finally, in each of these cases, evidence suggests that the presence of an advocacy network increased the probability of the transition from experimentation to implementation.

---

[572] Robert G Angevine, "Innovation and Experimentation in the US Navy: The UPTIDE Antisubmarine Warfare Experiments, 1969–72," *Journal of Strategic Studies* 28, no. 1 (February 2005), 94.
[573] The Honorable Robert Work, interview by Ryan Kendall, March 18, 2022.

For example, Howze's connections with senior officers such as Lieutenant General Gavin and the Secretary of Defense ensured that he would have the resources necessary to conduct experiments. This network also ensured the rhetoric and narrative associated with experimentation would make it to those who could drive implementation. For Howze, this proved essential for warding off external attacks from senior Air Force officers who disparaged the credibility of the experiments' results and the innovation Howze suggested.[574] Like the JFCOM case, the Assault Breaker experiments lacked sufficient advocacy within the Services. This reinforces the alternative explanation that advocacy networks must extend down into the Service leadership in joint experimentation.

The evidence from these additional cases strengthens the external validity of this dissertation's findings. However, further research is needed before inferring the argument applies in cases outside those examined in this dissertation.

### B. LIMITATIONS

This dissertation had two significant limitations. First, research for this project took place on a compressed timeline. This limited the number of cases within the dissertation. To make up for the limited number of cases, the author emphasized a thorough empirical examination of each case, using interviews to explore different perspectives, triangulate evidence, and bring out the human experiences associated with the social process of experimentation. Second, this research project occurred during the COVID pandemic. This limited access to Presidential Libraries, the National Archives, and associated Service archives. As a result, the case selection focused on where the evidence was available and the previous knowledge of the researcher. The two Army cases benefited from the availability of

[574] See Chapter 19 in Hamilton H. Howze, *A Cavalryman's Story: Memoirs of a Twentieth-Century Army General* (Washington, D.C: Smithsonian Institution Press, 1996), 233-257.

the Army Heritage and Education Center archives, the author's familiarity with Army institutions and history, and the author's network that facilitated access to retired Army senior leaders. While the COVID pandemic negatively impacted some portions of this project, it also provided opportunities in others. The closure of many archives resulted in a significant increase in the availability of digital archives. Also, the increased use of video conferencing platforms made it easier to access interviewees who previous to the pandemic may not have been as comfortable with the technology. In sum, these limitations, while significant, did not degrade this dissertation's value or the importance of its contributions to scholarship and policy.

## III. Implications

### A. SCHOLARSHIP

#### Policy subsystems and Advocacy Networks

Each of the cases within this dissertation provided examples of how the defense policy subsystem defined the context within which senior leaders attempted to innovate. At different times, different entities within the policy subsystem played more or less of a role, driven by external events and internal parameters. The variety of organizations, groups, and actors within the policy subsystem, such as think tanks, retired general officers, media, and industry, increased as each case moved forward in history, impacting experimentation efforts in different and unique ways. For example, Sullivan saw industry and academia as critical to his experimentation efforts, while the JFCOM case study highlighted the importance of retired officers and the media. As the context within which innovation takes place changes, so must the scholarship that examines it. Existing scholarship favors examining military leaders and their organizations or the role of specific groups, such as contractors or industry. There is little that examines how the interactions of each within the modern defense policy

subsystem impact experimentation. For military innovation studies to reflect the environment within which innovation occurs more closely, it should account for the complexity of these relationships. A more holistic approach to understanding the context of experimentation and innovation would bring military innovation studies in line with other schools, such as public policy, that use system-based frameworks to examine policy development and implementation.

If examining how the innovation process takes place within a system is more appropriate for studying innovation, then military innovation studies needs a better understanding of the role of advocacy networks within the innovation process. This dissertation builds on previous work from Ben Jensen regarding the role of advocacy networks in doctrine reform within the US Army. In a policy subsystem, networks connect constituents to facilitate the diffusion of new ideas and the rhetoric and evolving narratives associated with experimentation. Rather than seeing the expanded role of different entities as a hindrance, leaders such as Sullivan saw it as an opportunity to outmaneuver the traditional bureaucratic structures that often served as obstacles to change. Previous research highlights connections between bureaucratic leaders but does little to examine the role of networks in garnering support within key organizations and groups across the policy subsystem that increase the probability of transitioning to implementation.

## B. POLICY

### B.1. Developing Senior Leaders

Although each case reinforced the existing understanding that senior leaders are necessary but not sufficient for the innovation process, they also pointed toward the importance of senior leaders during the experimentation process and the need for organizations to create paths for their development. Of all the senior leaders examined in the

three case studies, General Gordon Sullivan stood out as the most prepared for the challenges he faced. Sullivan's possessed the intellect to develop a vision, the ability to communicate it to the right people to mobilize the forces of change, the charisma necessary to build trust with those who change would affect the most, and the force of personality to drive the innovation process.

The structures and processes Sullivan developed laid the foundation for Reimer to continue to explore nascent innovations. However, it is difficult to see how the Army and its senior leaders could overcome the obstacles to change without someone of Sullivan's capabilities. Sullivan harnessed his passion and translated it into an organizational momentum that carried forward into Reimer's tenure. Former Secretary Perry emphasized Sullivan's impact during this period:

> I look back at that period, and I think the Army was hugely successful in implementing new and important ideas. I'm sure there are many reasons for that, but I think the personality of Sullivan was key. Never underestimate the role of one energetic person trying to implement his experiment. I would emphasize the importance of an individual, not just conceiving and describing an idea, but working hard to make it happen. It's that political process in one sense. He has to work with other people and use arguments outside the realm of his experiments to get success. I think the Army implemented some very successful, well-conceived ideas, but the one thing that struck me the most at the time was the personality of General Sullivan.[575]

Sullivan's ability to persuade both senior leaders and those leaders deep down within the Army that change was both necessary and the right required a unique set of leadership skills.

In addition to these leadership skills, Sullivan benefited from the knowledge of his past experiences and the professional and personal networks he established. Sullivan's core advocacy network spanned well outside the Army and included key members of Congress. He saw himself first as one of many leaders within an open system, rather than just the

[575] The Honorable William J. Perry, interview by Ryan Kendall, January 28, 2022.

senior leader of an organization. This perspective made him biased towards a networked approach. His personal and professional networks enabled him to quickly deploy new ideas about how the Army should change to garner support and sense potential pockets of resistance within the policy subsystem. In comparison, General Meyer did not benefit from the same kind of network. His selection to be the Chief of Staff of the Army vaulted him ahead of many senior officers, placing him among leaders who had outranked him for most of his career. Additionally, Meyer had to work quickly to develop the network he would need to institute change rapidly. With only a short window within which he could impact innovation, he had a significant disadvantage.

If having General Sullivan was critical to the Army's success, how can organizations increase the probability of having leaders like him in the right position when they try to innovate? What skills made him unique, and how do organizations develop those skills in their leaders? While answering these questions is beyond the scope of this study, the important conclusion is that organizations must create developmental paths for leaders like Sullivan to increase the probability of meeting the demands of future requirements.

### B.2. Experimentation, Training, and Wargaming

With so much at stake in terms of budgetary and opportunity costs, military organizations must find ways to expose leaders to experimentation earlier on. Problem-solving techniques are not a new phenomenon in military organizations. For example, military professionals spend their careers learning how to train. Training, how it is resourced, planned, and executed, is the pre-dominant problem-solving approach. Wargaming is a staff activity in operational units, more common at higher echelons or within Professional Military Education institutions. In contrast, few, if any, military professionals have the opportunity to learn how to experiment.

Just like training, experimentation is a skill set that must be learned. Within the US military, experimentation lacks the same kind of language and structure, and therefore leaders struggle to conduct the imaginative problem-solving that experimentation demands. Furthermore, if peacetime military experimentation is a social process, experimentation should not be relegated to a small population of leaders. Instead, it needs leaders from different communities with the credibility and professional standing of operational experience to help build consensus.

Although this conclusion seems relatively apparent, its implications are significant for military organizations. Experimentation offers opportunities to explore new ideas, define new goals, and even examine new values and attributes. The case studies within this dissertation often highlighted that leaders' ability or inability to understand the difference significantly impacted experimentation. In the Force XXI example, leaders learned that experimentation required different skills and logic. In the Joint Forces Command case, the lack of understanding and familiarity with other problem-solving methods, and their inherent limitations, negatively impacted Millennium Challenge.

Experimentation is a skill that must be learned, just like training. The training revolution that occurred in the 1980s and so successfully changed the culture of the US military used a simple framework of tasks, conditions, and standards. It is a separate language that communicates boundaries, expectations, and methods. The military lacks the same kind of language and therefore struggles to conduct the imaginative problem-solving that a rapidly evolving environment demands. The training revolution of the 1980s was a significant, although underrated, innovation. It produced an extensive infrastructure to support near-term problem-solving, including instrumented ranges and simulations. These resources can support a similar, yet smaller scale, effort to expose military professionals to experimentation. Low-scale experimentation in the right environments could offer

opportunities to advance new ideas and develop leaders who can use alternate problem-solving methods to identify new solutions.

## IV. Future Research

While this dissertation makes several different contributions to academic research, it should mark the beginning of a much broader effort to understand experimentation. Future research can build on the work of this dissertation in several ways. First, military experimentation is not the norm for military organizations. Therefore, it often occurs within ad-hoc organizations, such as the High Technology Test Bed or Joint Forces Command J9, that come into being shortly after a senior leader initiates experimentation. In other cases, standing organizations have experimentation as their core mission, such as the Naval Warfare Development Command. Sometimes these organizations are placed far away from bureaucratic power centers to avoid corruption, and other times they are positioned directly in the middle. Policymakers would benefit from understanding the risks and benefits associated with different types of organizations and their associated relationships with their parent organization.

Second, future research should revisit this research question in more case studies to examine how the experimentation process occurs in different military organizations, political structures, and contexts. The universe of cases presented in this dissertation included only US examples. Future research should include additional examples from the universe of cases presented in this dissertation and foreign cases that examine the role of advocacy networks and senior sponsorship in alternative political models.

Finally, peacetime military experimentation is unique because it cannot fully replicate the phenomenon it examines. Other policy problems exist under the same limitations, such as civil defense, failure of critical infrastructure, or pandemics. Similar to military innovation,

it would make sense that experimentation would support innovation within other policy areas. Therefore, future research in policy studies should examine policy experimentation in these and other subject areas as social processes that assist senior leaders in building consensus around new ideas and innovations. This research might uncover alternative explanations or drivers that can support policy innovation studies.

# Appendix A: Acronyms

| | |
|---|---|
| ADEA | Army Development and Employment Agency |
| AMC | United States Army Materiel Command |
| AUSA | Association of the United States Army |
| AUSN | Association of the United States Navy |
| AWE | Advanced Warfighting Experiment |
| BoD | Board of Directors |
| CAC | Combined Arms Center |
| CSBA | Center for Strategic and Budgetary Analyses |
| CJCS | Chairman of the Joint Chiefs of Staff |
| CBRS | Concepts Based Requirements System |
| CPA | Chairman's Program Assessment |
| CPR | Chairman's Program Review |
| CSA | Chief of Staff of the Army |
| CTC | Combat Training Center |
| DARCOM | United States Army Development and Readiness Command |
| DARPA | Defense Advanced Research Projects Agency |
| DoD | Department of Defense |
| DSR | Defense Strategic Review |
| EBO | Effects Based Operations |
| EXFOR | Experimental Force |
| FAV | Fast Attack Vehicle |
| FORSCOM | United States Army Forces Command |
| FY | Fiscal Year |

| | |
|---|---|
| GHQ | General Headquarters |
| GOWG | General Officer Working Group |
| GPS | Global Positioning System |
| HQDA | Headquarters, Department of the Army |
| HTLD | High Technology Light Division |
| HTMD | High Technology Motorized Division |
| HTTB | High Technology Test Bed |
| ID | Infantry Division |
| ID86 | Infantry Division 86 |
| IDA | Institute for Defense Analyses |
| IPR | In-progress Review |
| JFCOM | United States Joint Forces Command |
| JROC | Joint Readiness Oversight Council |
| JWCA | Joint Warfighting Capability Assessments |
| LAM | Louisiana Maneuvers |
| LOI | Letter of Instruction |
| MC 2002 | Millennium Challenge 2002 |
| MOU | Memorandum of Understanding |
| MTR | Military Technical Revolution |
| MTW | Major Theater Wars |
| MTZ | Motorized |
| NDAA | National Defense Authorization Act |
| NDP | National Defense Panel |
| NTC | National Training Center |
| ONA | Office of Net Assessment or Operational Net Assessment |

| | |
|---|---|
| OOTW | Operations Other Than War |
| OPFOR | Opposing Force |
| ORSA | Operations Research/Systems Analysis |
| PA&E | Program Assessment and Evaluation |
| PPBS | Planning, Programming, and Budgeting System |
| QDR | Quadrennial Defense Review |
| OSD | Office of the Secretary of Defense |
| RDO | Rapid Decisive Operations |
| RDTF | Rapid Deployment Task Force |
| RMA | Revolution in Military Affairs |
| RPV | Remote Piloted Vehicle |
| SECDEF | Secretary of Defense |
| SJTFHQ | Standing Joint Task Force Headquarters |
| TRADOC | United States Army Training and Doctrine Command |
| UCP | Unified Command Plan |
| USACOM | United States Atlantic Command |
| UV01 | United Vision 2001 |
| WMD | Weapon(s) of Mass Destruction |

# Bibliography

Note: Individual documents from archival collections and interviews have been cited in footnotes and are not included in this bibliography.


9th Infantry Division Public Affairs Office. "'Skunk Works' Aids in New Light Division Development." *Army Research, Development, and Acquisition Magazine*, February 1983.

Abdelal, Rawi, Yoshiko M. Herrera, Alastair Iain Johnston, and Rose McDermott, eds. *Measuring Identity: A Guide for Social Scientists*. Cambridge, MA: Cambridge University Press, 2009.

Alberts, David S., and Richard E. Hayes. *Code of Best Practice for Experimentation*. CCRP Publication Series. Washington, D.C.: DoD Command and Control Research Program, 2002.

Angevine, Robert G. "Innovation and Experimentation in the US Navy: The UPTIDE Antisubmarine Warfare Experiments, 1969–72." *Journal of Strategic Studies* 28, no. 1 (February 2005): 77–105. https://doi.org/10.1080/01402390500032070.

Archuleta, Brandon J. "Fifty Years After the President's Commission on an All-Volunteer Armed Force - War on the Rocks," February 28, 2020. https://warontherocks.com/2020/02/fifty-years-after-the-presidents-commission-on-an-all-volunteer-armed-force/.

———. "Reimagining Autonomous Policy Subsystems." In *Twenty Years of Service: The Politics of Military Pension Policy and the Long Road to Reform*, 30–46. Lawrence, Kansas: University Press of Kansas, 2020.

Armacost, Michael H. *The Politics of Weapons Innovation: The Thor-Jupiter Controversy*. New York, NY: Columbia University Press, 1969.

Bacevich, A.J. *The Pentomic Era: The U.S. Army Between Korea and Vietnam*. National Defense University Press, 1986.

Bennett, Andrew. "Qualitative Methodologies." *The Encyclopedia of Political Science* 4 (2011): 1401–4.

Blaker, James. "Arthur K. Cebrowski: A Retrospective." *Naval War College Review* 59, no. 2 (Spring 2006): 129–46.

Borger, Julian. "When 'Saddam' Won the War. If the US and Iraq Go to War, There Can Only Be One Winner, Can't There? Maybe Not. This Summer, in a Huge Rehearsal of Just Such a Conflict - and with Retired Lieutenant General Paul Van Riper Playing Saddam - the US Lost. Julian Borger Asks the Former Marine How He Did It." *The Irish Times*, September 14, 2002, City Edition, sec. Weekend.

Bronfeld, Saul. "Fighting Outnumbered: The Impact of the Yom Kippur War on the U.S. Army." *The Journal of Military History* 71, no. 2 (2007): 465–98. https://doi.org/10.1353/jmh.2007.0096.

Brown, John Sloan. *Kevlar Legions: The Transformation of the US Army, 1989-2005*. Washington, D.C.: Center for Military History, 2011.

Bush, President George W. "A Period of Consequences, Speech at the Citadel," September 23, 1999. http://www3.citadel.edu/pao/addresses/pres_bush.html.

Cantor, Geoffrey. "The Rhetoric of Experiment." In *The Uses of Experiment*, edited by David Gooding, Trevor Pinch, and Simon Schaffer. Cambridge, UK: Cambridge University Press, 1989.

Cheney, David W, and Richard H. Van Atta. "DARPA's Processes for Creating New Programs." Technology Policy International, LLC, March 2016.

Christensen, Clayton M. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. The Management of Innovation and Change Series. Boston, Mass: Harvard Business School Press, 1997.

Constant, Edward W. *The Origins of the Turbojet Revolution*. Johns Hopkins Studies in the History of Technology. Baltimore: Johns Hopkins University Press, 1980.

Crawley, Vince. "War Game Outcome Was No Done Deal, DoD Officials Say." *Army Times*, September 2, 2002.

Crawley, Vince, and Jill DiPasquale. "Millennium Challenge Chief Defends Exercise's Integrity." *Army Times*, September 30, 2002.

Dean, Glenn A. "Army Experimentation Strategy: The Network Integration Evaluation and Rapid Acquisition," April 15, 2014. https://publications.armywarcollege.edu/pubs/71.pdf.

Dennis Farney. "High-Tech Soldiers: Army Division Tests Unconventional Gear To Increase Mobility --- But Would Antitank Missile On a Dune Buggy Work? Critics Aren't Convinced --- A 'Flying Trash Can' Flops." *Wall Street Journal*. June 26, 1985, Eastern edition. 398024860. ABI/INFORM Global.

Department of the Army. "Field Manual 100-5 Operations," June 14, 1993. Combined Arms Research Library.

———. "FM 100-5: Operations." Department of the Army, April 29, 1976. Combined Arms Research Library.

———. *Force XXI Operations: A Concept for the Evolution of Full-Dimension Operations for the Strategic Army of the Early Twenty-First Century*. Fort Monroe, VA: U.S. Army TRADOC, 1994.

Dibert, Lieutenant Colonel John C. "General Headquarters Insights." *Military Review* 77, no. 2 (April 1997): 61–67.

Drea, Edward J., Ronald H. Cole, Walter S. Poole, James F. Schnabel, Robert J. Watson, and Willard J. Webb. *History of the Unified Command Plan 1946-2012*. Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 2013. https://www.jcs.mil/Portals/36/Documents/History/Institutional/Command_Plan.pdf.

Engineer School Task Force XXI. "Shaping Force XXI Engineers." *Engineer* 24 (April 1995): 2–11.

Franks, General Frederick M. "Battle Labs: Maintaining the Edge." United States Army Training and Doctrine Command, May 1994.

———. "Full-Dimensional Operations: A Doctrine for an Era of Change." *Military Review* 72, no. 12 (1993): 5–10.

Freeman, Linton C. "Centrality in Social Networks Conceptual Clarification." *Social Networks* 1, no. 3 (January 1978): 215–39. https://doi.org/10.1016/0378-8733(78)90021-7.

Geddes, Barbara. "How the Cases You Choose Affect the Answers You Get: Selection Bias in Comparative Politics." *UC Berkeley Working Papers*, 1990.

Gehman Jr., Harold W., and James M. Dubik. "Military Transformation and Joint Experimentation." *Defense Horizons*, no. 46 (December 2004): 1–8.

Gerring, John. *Case Study Research: Principles and Practices*. New York, NY: Cambridge University Press, 2007.

Goedkoop, Colonel Thomas R., and Captain Barry E. Venable. "Task Force XXI: An Overview." *Military Review* 77, no. 2 (April 1997): 68–78.

Gooding, David, Trevor Pinch, and Simon Schaffer, eds. *The Uses of Experiment: Studies in the Natural Sciences*. Cambridge, UK: Cambridge University Press, 1989.

Graham, Bradley. "Army Trying Out Electrons to See If It Can Get Smaller and Faster." *Washington Post*, March 31, 1997.

Granovetter, Mark S. "The Strength of Weak Ties." *American Journal of Sociology* 78, no. 6 (May 1973): 1360–80.

Greitens, Sheena Elise. "Coercive Institutions and State Violence under Authoritarianism." Ph.D., Harvard University. Accessed June 29, 2021. http://www.proquest.com/docview/1417073276/abstract/8FE2D3AE5F1D4217PQ/1.

Grier, Peter. "From the Battlelabs." *Air Force Magazine* (blog), September 1, 1998. https://www.airforcemag.com/article/0998labs/.

Griffin, Stuart. "Military Innovation Studies: Multidisciplinary or Lacking Discipline?" *Journal of Strategic Studies* 40, no. 1–2 (January 2, 2017): 196–224. https://doi.org/10.1080/01402390.2016.1196358.

Grimm, Richard. "The Closure of U.S. Joint Forces Command - Mission Accomplished?" National Defense University, 2011.

Grissom, Adam. "The Future of Military Innovation Studies." *Journal of Strategic Studies* 29, no. 5 (October 2006): 905–34. https://doi.org/10.1080/01402390600901067.

Gumbert, MAJ Jack. "Leadership in the Digitized Force." *Military Review*, no. 33 (April 1998).

Haas, Peter M. "Introduction: Epistemic Communities and International Policy Coordination." In *Epistemic Communities, Constructivism and International Environmental Politics*, 1st ed., 73–107. London: Routledge, 2015.

Hall, John W. "To Starve an Army: How Great Power Armies Respond to Austerity." In *Sustainable Security: Rethinking National Security Strategy*, edited by Benjamin Valentino and Jeremi Suri. New York, NY, 2016.

Hanna, Mark. "Task Force XXI: The Army's Digital Experiment." *Institute for National Strategic Studies*, no. 119 (July 1, 1997). https://doi.org/10.21236/ADA385995.

Haraburda, LTC Scott S. "Army Science Board — Providing a Half Century of Scientific Advice and Guidance." *Army AL&T*, March 2006, 70–73.

Harris III, LTC James E. "To Fight Digitized or Analog." *Military Review* 89, no. 6 (Nov-Dec 99): 12–17.

Hebert, Paul H. *Deciding What Has to Be Done: General William E. Depuy and the 1976 Edition of FM 100-5, Operations*. Leavenworth Paper, No. 16. Ft. Leavenworth, VA: Combat Studies Institute, Command and General Staff College, 1988.

Holzer, Robert. "JCS Quietly Gathers Up Reins of Power." *Defense News*, June 13, 1994, A1–2.

Horn, Carl J. "Military Innovation and the Helicopter: A Comparison of Development in the United States Army and Marine Corps, 1945-1965." The Ohio State University, 2004. https://etd.ohiolink.edu/pg_10?0::NO:10:P10_ACCESSION_NUM:osu1240844876#abstract-files.

Horowitz, Michael C., and Shira Pindyck. "What Is a Military Innovation and Why It Matters." *Journal of Strategic Studies*, March 22, 2022, 1–30. https://doi.org/10.1080/01402390.2022.2038572.

Howze, Hamilton H. *A Cavalryman's Story: Memoirs of a Twentieth-Century Army General*. Washington, D.C: Smithsonian Institution Press, 1996.

Huddleston, Joe D. *High Technology Test Bed and the High Technology Light Division; Inception through 30 September 1983 DRAFT*. Vol. I. Fort Lewis, WA: I Corps, 1984.

Jablonsky, David. "US Military Doctrine and the Revolution in Military Affairs." *Parameters* 24, no. 1 (1994): 18–36.

Jaffe, Lorna S. "The Development of the Base Force 1989 - 1992:" Fort Belvoir, VA: Defense Technical Information Center, July 1, 1993. https://doi.org/10.21236/ADA276236.

Jensen, Benjamin M. *Forging the Sword: Doctrinal Change in the U.S. Army*. Stanford, CA: Stanford University Press, 2016.

Judson, Jen. "US Army's FY22 Budget Backs Modernization, Cuts 'down into Bone' of Legacy Fleet." Defense News, May 28, 2021. https://www.defensenews.com/congress/budget/2021/05/28/us-armys-fy22-budget-backs-modernization-cuts-down-into-bone-of-legacy-fleet/.

Kass, Richard. *The Logic of Warfighting Experiments*. The Future of Command and Control. Washington, DC: DoD Command and Control Research Program, 2006. http://www.dodccrp.org/events/12th_ICCRTS/CD/library/html/pdf/Kass_Logic.pdf.

Keefer, Edward C. *Harold Brown: Offsetting the Soviet Military Challenge 1977-1981*. Secretaries of Defense Historical Series, volume 9. Washington, DC: Historical Office, Office of the Secretary of Defense, 2017.

Krepinevich, Andrew F. "Military Experimentation: Time to Get Serious." *Naval War College Review* 54, no. 1 (Winter 2001): 76–89.

Krepinevich, Andrew, and Barry Watts. *The Last Warrior: Andrew Marshall and the Shaping of Modern American Defense Strategy*. New York, NY: Basic Books, 2015.

Krygiel, Annette J. *Behind the Wizard's Curtain: An Integration Environment for a System of Systems*. CCRP Publication Series. Washington, D.C.: National Defense University, 1999.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*. 2nd ed. International Encyclopedia of Unified Science. Foundations of the Unity of Science; v. 2, No. 2. Chicago: University of Chicago Press, 1970.

Kuo, Kendrick. "Military Magic: The Promise and Peril of Military Innovation." Ph.D., The George Washington University, 2021. http://www.proquest.com/docview/2572969896/abstract/20F85BEE284247C3PQ/1.

Lindblom, Charles E. "The Science of 'Muddling Through.'" *Public Administration Review* 19, no. 2 (1959): 79–88. https://doi.org/10.2307/973677.

Locher III, James R. *Victory on the Potomac: The Goldwater-Nichols Act Unifies the Pentagon*. College Station, TX: Texas A&M University Press, 2004.

Machiavelli, Niccolò. *The Prince*. 2nd ed. Chicago, IL: University of Chicago Press, 1998.

MacKenzie, Donald A. "From Kwajalein to Armageddon? Testing and the Social Construction of Missile Accuracy." In *The Uses of Experiment*, edited by David Gooding, Trevor Pinch, and Simon Schaffer, 409–35. Cambridge, UK: Cambridge University Press, 1989.

———. *Inventing Accuracy: An Historical Sociology of Nuclear Missile Guidance*. Inside Technology. Cambridge, Mass: MIT Press, 1990.

Mackey, Major Bruce D. "Doctrinal Publications." *Infantry* 75, no. 2 (April 1985): 38–39.

Magnuson, Stew. "Army's Project Convergence Continues on 10-Year Learning Curve," December 17, 2021. https://www.nationaldefensemagazine.org/articles/2021/12/17/armys-project-convergence-continues-on-10-year-learning-curve.

Mahnken, Thomas G. "China's Anti-Access Strategy in Historical and Theoretical Perspective." *Journal of Strategic Studies* 34, no. 3 (June 2011): 299–323. https://doi.org/10.1080/01402390.2011.574971.

Malham, MAJ Mark C., and Debora Gabbard. "Battle Command Systems: The Force XXI Warfighter's Advantage." *Military Review*, February 1998.

March, James G. "Exploration and Exploitation in Organizational Learning." *Organization Science* 2, no. 1, (1991): 71–87.

———. "The Technology of Foolishness." In *Decisions and Organizations*, 253–65. Cambridge, MA: Basil Blackwell, 1988. https://doi.org/10.4324/9781315161921-6.

McCool, Daniel. *Public Policy Theories, Models and Concepts: An Anthology*. Englewood Cliffs, Nj: Prentice Hall, 1995.

———. "The Subsystem Family of Concepts: A Critique and a Proposal." *Political Research Quarterly* 51, no. 2 (June 1998): 551–70.

McCue, Brian. "The Practice of Military Experimentation:" Fort Belvoir, VA: Defense Technical Information Center, February 1, 2003. https://doi.org/10.21236/ADA596829.

McDonough, James R. "Versatility: The Fifth Tenet." *Military Review* 73, no. 12 (1993): 11–14.

Mcleary, Paul, and Lee Hudson. "How Two Dozen Retired Generals Are Trying to Stop an Overhaul of the Marines." POLITICO, April 1, 2022. https://www.politico.com/news/2022/04/01/corps-detat-how-two-dozen-retired-generals-are-trying-to-stop-an-overhaul-of-the-marines-00022446.

Meinhart, Richard M. *Joint Strategic Planning System Insights: Chairmen Joint Chiefs of Staff 1990 to 2012*. Letort Papers. Carlisle, PA: Strategic Studies Institute and U.S. Army War College Press, 2013.

Meyer, Edward C. "Today's Army and Its Progress." *Defense 82 Magazine*, April 1, 1982.

Meyer, GEN(R) Edward C. *E.C. Meyer: General, United States Army, Chief of Staff, June 1979-June 1983*. Washington, D.C.: Department of the Army, 1983.

———. "Today's Army and Its Progress." *Defense 82 Magazine*, April 1, 1982.

Middleton, Drew. "U.S. Unit Is Relying on Sleek New Arms: Soviet Has Edge in Big Weapons, But Rapid Deployment Force Has Technological Aces." *New York Times (1923-)*. March 23, 1981. 121551288. ProQuest Historical Newspapers: The New York Times.

"Military Transformation: Actions Needed to Better Manage DOD's Joint Experimentation Program." Report to Congressional Committees. Washington, D.C.: United States General Accounting Office, August 2002.

Moenk, Jean R. "Operation Steadfast Historical Summary: A History of the Reorganization of the U.S. Continental Army Command (1972-1973)." U.S. Army Forces Command, October 1, 1974. U.S. Training and Doctrine Command.

"Motorized Experience of the 9th Infantry Division 1980-1989." Fort Lewis, WA: Department of the Army, June 9, 1989. https://apps.dtic.mil/dtic/tr/fulltext/u2/a370233.pdf.

Murray, Williamson, and Alan R. Millett, eds. *Military Innovation in the Interwar Period*. New York, NY: Cambridge University Press, 1996.

Nagl, John A. *Learning to Eat Soup with a Knife: British and American Army Counterinsurgency Learning during the Malayan Emergency and the Vietnam War*. Chicago, IL: University of Chicago Press, 2002.

National Research Council. *The Role of Experimentation in Building Future Naval Forces*, 2004. https://doi.org/10.17226/11125.

Naylor, Sean. "Digitized Brigade Struts Its Stuff in First Action." *Army Times*, January 13, 1997.

———. "War Games Rigged?" *Army Times*, August 16, 2002.

Odeen, Philip A. "Transforming Defense: National Security in the 21st Century." Arlington, VA: National Defense Panel, December 1997.

Office of the Chairman of the Joint Chiefs of Staff. "Department of Defense Dictionary of Military and Associated Terms." The Joint Staff, January 2021. https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf?ver=idnWjT-PxzWCi3IHTV1-xQ%3d%3d.

Osgood, Carl. "Was 'Millennium Challenge' War Game Fixed for U.S.?" *Executive Intelligence Review*, September 6, 2002, 68–69.

Owens, ADM William A. "The Emerging U.S. System-of-Systems." *Institute for National Strategic Studies Strategic Forum*, no. 63 (February 1996).

Owens, Mackubin Thomas. "Let's Not Rig Our War Games - WSJ." *Wall Street Journal*, August 29, 2002. https://www.wsj.com/articles/SB1030585211145215475.

Perceval, Major Robert. "9th Infantry Division (Motorized)-Ready Now!" *Military Intelligence* 11, no. 2 (June 1985): 18–22.

Rearden, Steven L., and Kenneth R. Foulks, Jr. *The Joint Chiefs of Staff and National Policy 1977-1980*. Washington, D.C.: Office of Joint History, 2015. https://www.jcs.mil/Portals/36/Documents/History/Policy/Policy_V012.pdf.

Reimer, Dennis J. *Soldiers Are Our Credentials: The Collected Works and Selected Papers of the Thirty-Third Chief of Staff United States Army*. Edited by LTC James Jay Carafano. Fort McNair, VA: Center for Military History, 2000.

Reitz, John W. "Managing Intellectual Change: Army's Revision of FM 100-5." *Army*, September 1992.

Richter, Paul. "Army Puts Computer-Based Technology to Battlefield Test." *LA Times*. March 31, 1997.

Robertson, Maurice. "'High Tech' Means 'Hi-Gear' Action." *International Combat Arms*, March 1985.

Romjue, John L. *American Army Doctrine for the Post-Cold War*. Vol. CMH Pub 69-1. TRADOC Historical Monograph Series. Fort Monroe, VA: Military History Office, Training and Doctrine Command, 1996.

———. "The Army of Excellence. The Development of the 1980s Army:" Fort Belvoir, VA: Defense Technical Information Center, August 1, 1993. https://doi.org/10.21236/ADA269724.

———. *A History of Army 86, Division 86: The Development of the Heavy Division, September 1978-October 1979*. Vol. I. II vols. TRADOC Historical Monograph Series. Ft. Monroe, VA: Historical Office, HQ TRADOC, 1982.

———. *A History of Army 86, Division 86: The Development of the Light Division, the Corps, and Echelon Above Corps, November 1979-December 1980*. Vol. II. II vols. TRADOC Historical Monograph Series. Ft. Monroe, VA: Historical Office, HQ TRADOC, 1982.

Rosen, Stephen Peter. "New Ways of War: Understanding Military Innovation." *International Security* 13, no. 1 (1988): 134–68. https://doi.org/10.2307/2538898.

———. *Winning the next War: Innovation and the Modern Military*. Ithaca: Cornell University Press, 1991.

Sabatier, Paul A., and Christopher M. Weible. "The Advocacy Coalition Framework: Innovations and Clarifications." In *Theories of the Policy Process*, edited by Paul A. Sabatier, 2nd ed., 189–220. Boulder, CO: Westview Press, 2007.

Sabatier, Paul A., Christopher M. Weible, Hank C. Jenkins-Smith, and Daniel Nohrstedt. "The Advocacy Coalition Framework: Foundations, Evolution, and Ongoing Research." In *Theories of the Policy Process*, edited by Paul A. Sabatier and Christopher M Weible. Boulder, CO: Westview Press, 2014.

Sanchez, Carlos. "High Tech Night Fighters Hit Bliss-Based Cavalry Regiment." *El Paso Herald-Post*. March 1985.

Sapolsky, Harvey M. *The Polaris System Development: Bureaucratic and Programmatic Success in Government*. Cambridge, MA: Harvard University Press, 1972.

Schudel, Matt. "Edward C. Meyer, General Who Revamped Post-Vietnam 'Hollow Army,' Dies at 91." *Washington Post*, October 13, 2020, sec. Obituaries. https://www.washingtonpost.com/local/obituaries/edward-c-meyer-general-who-revamped-post-vietnam-hollow-army-dies-at-91/2020/10/13/141fbc48-0436-11eb-a2db-417cddf4816a_story.html.

Slater, Dan, and Daniel Ziblatt. "The Enduring Indispensability of the Controlled Comparison." *Comparative Political Studies* 46, no. 10 (October 2013): 1301–27. https://doi.org/10.1177/0010414012472469.

Slaughter, Anne-Marie. *The Chessboard and the Web: Strategies of Connection in a Networked World*. The Henry L. Stimson Lectures Series. New Haven: Yale University Press, 2017.

Sorley, Lewis, ed. *Press On! Selected Works of General Donn A. Starry*. Vol. I. Fort Leavenworth, KS: Combat Studies Institute Press, 2009. https://www.armyupress.army.mil/Portals/7/combat-studies-institute/csi-books/PressOnI.pdf.

Strachan, Hew. *The Direction of War: Contemporary Strategy in Historical Perspective*. Cambridge, UK: Cambridge University Press, 2013.

Sullivan, Gordon R. *The Collected Works of the Thirty-Second Chief of Staff, United States Army: June 1991-June 1995*. Washington, D.C.: Department of the United States Army, 1996.

Sullivan, Gordon R., and James M. Dubik. *Envisioning Future Warfare*. Fort Leavenworth, KS: US Army Command and General Staff College Press, 1995. http://hdl.handle.net/2027/msu.31293023231990.

Sullivan, Gordon R., and Michael V. Harper. *Hope Is Not a Method: What Business Leaders Can Learn from America's Army*. New York, NY: Times Business, 1996.

Tedstrom, John E., and John G. McGinn. "Planning America's Security: Lessons from the National Defense Panel." RAND, 1999.

Tilly, Charles. *Identities, Boundaries, and Social Ties / Charles Tilly*. London, [England] ; Routledge, 2016.

Twohig, COL John J., MAJ Thomas J. Stokowski, and MAJ Bienvenido Rivera. "Structuring Division XXI." *Military Review*, June 1998.

Defense Weekly. "US Army 9th Infantry Division: Experts in the Unconventional," October 26, 1985.

"U.S. Military Spending/Defense Budget 1960-2022." Accessed April 4, 2022. https://www.macrotrends.net/countries/USA/united-states/military-spending-defense-budget.

Van Atta, Richard H., Sidney G. Reed, and Seymour J. Deitchman. "DARPA Technical Accomplishments. Volume 2. An Historical Review of Selected DARPA Projects."

Fort Belvoir, VA: Defense Technical Information Center, April 1, 1991. https://doi.org/10.21236/ADA241725.

Wass de Czege, Colonel Hubba. "More on Infantry." *Infantry* 76, no. 5 (October 1986): 13–15.

———. "Three Kinds of Infantry." *Infantry* 75, no. 4 (August 1985): 11–13.

Worley, D. Robert. "Defining Military Experiments." Alexandria, VA: Institute for Defense Analyses, February 1999.

Yarrison, James L. *The Modern Louisiana Maneuvers*. Washington, D.C.: Center for Military History, 1999.

Zenko, Micah. "Millennium Challenge: The Real Story of a Corrupted Military Exercise and Its Legacy." War on the Rocks, November 5, 2015. https://warontherocks.com/2015/11/millennium-challenge-the-real-story-of-a-corrupted-military-exercise-and-its-legacy/.

———. *Red Team: How to Succeed by Thinking like the Enemy*. New York, NY: Basic Books, 2015.