US Army Tactical Nuclear Doctrine in the Cold War

A Monograph

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Current US Army doctrine assumes a nuclear capable enemy will likely not use low-yield battlefield nuclear weapons. That assumption is no longer valid. The 2017 National Security Strategy and the 2018 Nuclear Posture Review both anticipate a high likelihood of a tactical battlefield characterized by an enemy employing nuclear weapons. Such an assumption was hardwired into Cold War Army doctrine. Thus Cold War-era doctrine provides a set of examples to help current Army professionals understand how to prepare for a nuclear battlefield. This monograph examines the doctrinal series FM 100-5 Operations, FM 100-15 Larger Units / Corps, and FM 61-100 and FM71-100 Division from 1950-1990 and provides three...

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Abstract

US Army Tactical Nuclear Doctrine in the Cold War, by MAJ Benjamin C. Stumpf, 44 pages.

Current US Army doctrine assumes a nuclear capable enemy will likely not use low-yield battlefield nuclear weapons. That assumption is no longer valid. The 2017 *National Security Strategy* and the 2018 *Nuclear Posture Review* both anticipate a high likelihood of a tactical battlefield characterized by an enemy employing nuclear weapons. Such an assumption was hardwired into Cold War Army doctrine. Thus Cold War-era doctrine provides a set of examples to help current Army professionals understand how to prepare for a nuclear battlefield. This monograph examines the doctrinal series FM 100-5 *Operations*, FM 100-15 *Larger Units* / *Corps*, and FM 61-100 and FM71-100 *Division* from 1950-1990 and provides three recommendations: 1. Include a nuclear environment specific appendix to all major manuals; 2. Within all major operations, routinize a decision point to switch from a nonnuclear to a nuclear paradigm, with an accompanying planning sequel; 3. Incorporate nuclear environments into training.

Note: This monograph is not an endorsement for the employment of low-yield nuclear weapons. It is simply an academic study to prepare American officers and decision makers for the grave possibility of a nuclear battlefield.

Contents

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Abbreviations

ADP	Army Doctrine Publication
CBRN	Chemical, Biological, Radiological, and Nuclear
FM	Field Manual
G-2	Military Intelligence Staff
NEAT	Nuclear Employment Augmentation Team
PAM	Pamphlet
TRADOC	US Army Training and Doctrine Command
WfF	Warfighting Function

Tables

Introduction

One hundred seconds; that is all the time left for humanity, at least according to the Doomsday Clock. Since 1947, the *Bulletin of Atomic Scientists*' Doomsday Clock has counted down the time until midnight–the time until nuclear war and the destruction of the world–and humanity has never been closer to midnight than it is right now.[1] Members of the *Bulletin of Atomic Scientists* are not the only ones who believe the world is close to nuclear war. Official United States security documents also foresee a world with an increasing likelihood of nuclear conflict. As a part of the American defense establishment, the United States Army must endeavor to fight and win in such a world. However, current Army doctrine does not anticipate a nuclear battlefield. With doctrine as the primary guide for training, there emerges a potential gap in how the Army is training for the future and what the future may bring.

This monograph seeks to assist current Army doctrine anticipate a nuclear battlefield. It does so by examining differences between current doctrine, which does not anticipate a nuclear battlefield, and Army doctrine that did anticipate a nuclear battlefield, namely doctrine from the Cold War. Specifically, it addresses the following research question; how can current Army doctrine incorporate and adapt Cold War-era nuclear doctrine to better prepare for large scale combat operations? This analysis of a nuclear battlefield is concerned only with tactical and operational effects from nuclear weapons. As such, this monograph is not concerned with strategic nuclear weapons but only low-yield battlefield nuclear weapons, defined as "a nuclear weapon with a yield of less than 15 kilotons and used to create tactical or operational effects against military targets, primarily ground forces, within a specified theater. The use of such

[1] Gayle Spinaze, *It Is Now 100 Seconds to Midnight* (Washington, DC: Bulletin of the Atomic Scientists, 2020).

weapons also has strategic implications."[2] As a monograph in the public domain, this monograph only uses unclassified documents, including declassified ones.

Background

The United States government is increasingly convinced that the world is becoming more nuclearized. Claiming the "global threat conditions have worsened markedly," the 2018 *Nuclear Posture Review* goes on to say that "the United States now faces a more diverse and advanced nuclear-threat environment than ever before."[3] The 2017 *National Security Strategy* specifically names Russia and China as states that are enhancing their nuclear arsenals and threatening the United States' worldwide position.[4] Iran and North Korea are also named as rogue states whose nuclear ambitions are upsetting regional balances against the United States.[5]

To combat such nuclear threats, American foreign policy applies "a tailored and flexible approach to effectively deter across the spectrum of adversaries, threats, and context."[6] The 2018 *National Defense Strategy* says the US military deters nuclear attacks through "forward force maneuver and posture resilience."[7] The 2018 *National Military Strategy* expands this idea by identifying three related mission areas: respond to threats, deter strategic attack, and deter conventional attack.[8]

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[2] Adam B. Lowther, *Definition of "Low-Yield Battlefield Nuclear Weapon*, Electronic correspondence (Fort Leavenworth, KS: School of Advanced Military Studies, December 19, 2020).

[3] Department of Defense, *Nuclear Posture Review* (Washington, DC: Government Printing Office, 2018), v.

[4] Executive Office of the President of the United States, National Security Council, *National Security Strategy of the United States of America* (Washington, DC, 2017), 25-26.

[5] 2017 National Security Strategy, 26.

[6] Department of Defense, *Nuclear Posture Review* (2018), vii.

[7] Department of Defense, *Summary of the 2018 National Defense Strategy of the United States of America* (Washington, DC: Government Printing Office, 2018), 6.

[8] Department of Defense, *Description of the National Military Strategy 2018* (Washington, DC: Government Printing Office, 2018), 3.

The US Army supports this national strategy as an important component of deterrence. Since the US Army is no longer a nuclearized force,[9] it can provide little direct nuclear strategic deterrence. However, its effectiveness comes from its credibility as a nonnuclear (i.e., conventional) force. Without a conventional force, the United States would have no option short of nuclear warfare, which is likely a high threshold to cross. As a deterrent option short of nuclear warfare, the Army needs to have the capability to operate, for at least a short period of time, once the nuclear threshold is crossed. Therefore, a lack of preparedness for a nuclear battlefield is a potential weakness in American deterrence policy, but a correctable one. This monograph seeks to assist in that endeavor.

Methodology

This study employs a type of meta-analysis methodology. A meta-analysis is "a quantitative statistical analysis of several separate but similar experiments or studies in order to test the pooled data for statistical significance."[10] Sam J. Tangredi's *Futures of War: Towards a Consensus View of the Future Security Environment, 2010-2035* serves as the primary model.[11]

The research question for this study is, "How can current US Army doctrine incorporate and adapt Cold War-era nuclear doctrine to better prepare for large scale combat operations?" The meta-analytical process to answering this question includes several steps. First, the study conducted a preliminary scan of the historical doctrine available. This scan determined the Field Manual (FM) 100-5 *Operations*, FM 100-15 *Larger Units* / *Corps*, and FM 61-100 and FM71-100 *Division* series from 1950-1990 are the most pertinent. Second, the study developed criteria by which to analyze the historical doctrine. The criteria included two broad categories:

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[9] Eli Corin, *Presidential Nuclear Initiatives: An Alternative Paradigm for Arms Control* (Washington, DC: Nuclear Threat Initiative, 2004).

[10] Merriam-Webster.com Dictionary, *Meta-Analysis* (Springfield, MA: Merriam-Webster, Inc., accessed November 20, 2020).

[11] Sam J. Tangredi, *Futures of War: Toward a Consensus View of the Future Security Environment, 2010-2035* (Newport, RI: Alidade Press, 2008), 25-32.

"Assumptions About the Operating Environment" and "Friendly Tactical Considerations." Further information on the criteria is in the next section. Third, the criteria were applied to the selected historical doctrine, which illuminated an historical consensus. Fourth, that consensus was contrasted with relevant current doctrine on the same criteria. Finally, based on the comparison of the historical and current consensuses, the study concludes with some conclusions and also some recommendations on how to apply those conclusions to the Army today.

Criteria

The criteria are divided into two sets. The first criteria set focuses on the operating environment. This set includes the general political atmosphere and, more specifically, the battlefield conditions. Its purpose is to help make explicit what the various doctrinal manuals assume and anticipate about the battlefield. Understanding the assumptions of the Army is important to understanding why certain tactics are developed and promoted.

There are five questions used in this set to help define the operational environment. First, does doctrine anticipate a nuclear environment? Second, does doctrine discuss the aspects of a nuclear environment? Third, does the doctrine anticipate enemy use of nuclear weapons? Fourth, does the doctrine anticipate friendly use of nuclear weapons? Fifth, how long does doctrine anticipate nuclear combat lasting?

The second criteria set focuses on friendly tactics used by corps and smaller units. The purpose of this category is to identify the specific tactics and/or procedures used by the Army on a nuclear battlefield. Since the focus of this paper is on the nuclear battlefield, typically only nuclear-specific portions of the historical doctrine are discussed. To make comparisons with current tactics easier, the six Army warfighting functions (WfF) are used as tactical groupings.

The first WfF is movement and maneuver, defined as the "tasks and systems that move and employ forces to achieve a position of relative advantage over the enemy and other

threats."[12] Fires is the second WfF, and it includes the "tasks and systems that create and converge effects in all domains against the adversary or enemy to enable operations across the range of military operations. These tasks and systems create lethal and nonlethal effects."[13] The third WfF is protection. Protection includes "the tasks and systems that preserve the force so the commander can apply maximum combat power to accomplish the mission."[14] Essentially, the protection WfF "enables the commander to maintain the force's integrity and combat power," by countering or mitigating "threats before they can act."[15]

Intelligence is the fourth WfF. It includes "tasks and systems that facilitate understanding the enemy, terrain, weather, civil considerations, and other significant aspects of the operational environment."[16] The intelligence WfF also "synchronizes information collection with primary tactical tasks of reconnaissance, surveillance, security, and intelligence operations."[17] The fifth WfF is sustainment. Sustainment comprises the "tasks and systems that "provide support and services to ensure freedom of action, extended operational reach, and prolong endurance. Sustainment determines the depth and duration of Army operations."[18] The final WfF is command and control. Command and control encompasses the "tasks and systems that enable commanders to synchronize and converge all elements of combat power."[19] Command and control assists "commanders in integrating the other elements of combat power (leadership,

[12] Department of the Army, Army Doctrine Publication (ADP) 3-0, *Operations* (Washington, DC: Government Publishing Office, 2019), 5-3.

[13] US Army, ADP 3-0, 5-4.

[14] US Army, ADP 3-0, 5-6.

[15] US Army, ADP 3-0, 5-6.

[16] US Army, ADP 3-0, 5-4.

[17] US Army, ADP 3-0, 5-4.

[18] US Army, ADP 3-0, 5-5.

[19] US Army, ADP 3-0, 5-3.

information, movement and maneuver, intelligence, fires, sustainment, and protection) to achieve objectives and accomplish missions."[20]

Together, the two criteria sets allow for the understanding of how the historical potential nuclear battlefield was contextualized and how Army forces planned to operate within it. Knowing how to visualize the battlefield and understanding how best to employ forces on that battlefield are two of the most critical skills for Army professionals, and they are relevant to preparing for a future nuclear battlefield.

Sources

The sources for this study consist entirely of US Army doctrine, both historical and current. A short introduction to the historical doctrinal series follows.

The FM 100-5 *Operations* series was the capstone manual for Army operations during the Cold War. It "sets forth the doctrine for leading troops in combat and the broad aspects and principles of military operations of the combined arms and services."[21] The versions used are: 1954, 1962, 1968, 1976, 1982, and 1986.[22] These versions comprise all versions of the series during the Cold War. The 1962 and later versions primarily use the term "nuclear," while "atomic" was the word of choice in 1954. Only in the 1976 version is a discussion of nuclear operations and nuclear battlefields consolidated from across all the chapters into a single nuclear-specific section.[23] The 1976 version is also the first to specifically identify an enemy: the Warsaw

[20] US Army, ADP 3-0, 5-3.

[21] Department of the Army, Field Manual (FM) 100-5, *Field Service Regulations: Operations* (Washington, DC: Government Printing Office, 1954), 4.

[22] US Army, FM 100-5 (1954); Department of the Army, Field Manual (FM) 100-5, *Field Service Regulations: Operations* (Washington, DC: Government Printing Office, 1962) Department of the Army, Field Manual (FM) 100-5, *Operations of Army Forces in the Field* (Washington, DC: Government Printing Office, 1968); Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: Government Printing Office, 1976); Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: Government Printing Office, 1982); Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: Government Printing Office, 1986).

[23] US Army, FM 100-5 (1976), Chapter 10.

Pact, in general, and the Soviet Union, specifically.[24] The 1982 and 1986 versions are distinct in their direct reference to AirLand Battle as the Army's warfighting ideology.[25]

The FM 100-15 series goes by several names from 1950 to 1989, including *Larger Units* in 1950 and 1963, *Larger Units: Theater Army-Corps* in 1968 and 1973, *Larger Unit Operations* in 1974, and *Corps Operations* in 1989.[26] While the names change, the content always discusses the operations of Army echelons above division, changing from providing "guidance to commanders and staff officers at corps, field army, army group, and theater army level in functions and operations of these larger units" in 1963 to 1989's guiding "the employment of US Army corps in combat."[27] The historical evolution of this series is similar to FM 100-5. The 1950 version only has four mentions of anything related to a nuclear battlefield, and does not use the word "nuclear."[28] By 1963, nuclear content is present in nearly every chapter. However, in 1989 nuclear operations are consolidated into an appendix, with the remainder of the manual consumed by AirLand Battle.[29] The 1950 and 1963 versions provide the early Cold War assessment of corps and larger operations, while the 1989 version explains corps operations at the end of the era.

The doctrinal series for division operations includes FM 61-100 *The Division* and FM 71-100 *Division Operations*. While the series changes numbers, its focus remains firmly on the division and its operations. FM 61-100's versions include 1962, 1965, and 1968, while FM 71-

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[24] US Army, FM 100-5 (1976), 1-2, 2-2, 11-3.

[25] US Army, FM 100-5 (1982), 1-1, 7-1 to 7-3; US Army, FM 100-5 (1986), ii, Chapter 2.

[26] Department of the Army, Field Manual (FM) 100-15, *Field Service Regulations: Larger Units* (Washington, DC: Government Printing Office, 1950); Department of the Army, Field Manual (FM) 100-15, *Field Service Regulations: Larger Units* (Washington, DC: Government Printing Office,1963); Department of the Army, Field Manual (FM) 100-15, *Larger Units: Theater Army-Corps* (Washington, DC: Government Printing Office, 1968); Department of the Army, Field Manual (FM) 100-15, *Larger Units: Theater Army-Corps* (Washington, DC: Government Printing Office, 1973); Department of the Army, Field Manual (FM) 100-15, *Larger Unit Operations* (Washington, DC: Government Printing Office, 1974); Department of the Army, Field Manual (FM) 100-15, *Corps Operations* (Washington, DC: Government Printing Office, 1989).

[27] US Army, FM 100-15 (1963), 3; US Army, FM 100-15 (1989), i.

[28] US Army, FM 100-15 (1950), 18, 23, 25, 69.

[29] US Army, FM 100-15 (1989), Appendix E.

100's versions include 1978, 1980 (nominally FM 71-101 because its covers non-vehicular divisions, while 1978's version covers vehicular divisions), and 1990.[30] All versions except 1990 have nuclear aspects discussed throughout the manual, while 1990 primarily consolidates them into an annex.[31] The 1990 version is also the only one where the Soviet Union is used throughout the manual as the enemy, with the 1978 and 1980 versions paying only lip service to the Soviet threat in their introductions.[32] Like the FM 100-5 series, the *Division* series is bookended with detailed analysis, 1962's FM 61-100 and 1990's FM 71-100, to compare the doctrine for division operations in the beginning and end of the Cold War. The remaining versions of 1965, 1968, 1978, and 1980, are used as needed to highlight only major doctrinal shifts.

Current doctrine is categorized according to warfighting function. As the warfighting function designations are not absolute, several doctrinal manuals span across two or more warfighting functions. The key manual that crosses warfighting functions is FM 3-94 *Theater Army, Corps, and Division Operations*.[33] The current doctrinal references used for this monograph are intuitively named, so no summary is provided. For the movement and maneuver WfF, ADP 3-0 *Operations*, FM 3-0 *Operations*, and ADP 3-90 *Offense and Defense* are used.[34] The fires WfF comprises ADP 3-19 *Fires* and FM 3-09 *Fire Support and Field Artillery*

[30] Department of the Army, Field Manual (FM) 61-100, *The Division* (Washington, DC: Government Printing Office, 1962); Department of the Army, Field Manual (FM) 61-100, *The Division* (Washington, DC: Government Printing Office, 1965); Department of the Army, Field Manual (FM) 61-100, *The Division* (Washington, DC: Government Printing Office, 1968); Department of the Army, Field Manual (FM) 71-100, *Armored and Mechanized Division Operations* (Washington, DC: Government Printing Office, 1978); Department of the Army, Field Manual (FM) 71-101, *Infantry, Airborne, and Air Assault Division Operations* (Washington, DC: Government Printing Office, 1980); Department of the Army, Field Manual (FM) 71-100, *Division Operations* (Washington, DC: Government Printing Office, 1990).

[31] US Army, FM 71-100 (1990), Appendix E.

[32] US Army, FM 71-100 (1978), 2-1; US Army, FM 71-101 (1980), 2-1.

[33] Department of the Army, Field Manual (FM) 3-94, *Theater Army, Corps, and Division Operations* (Washington, DC: Government Publishing Office, 2014).

[34] US Army, ADP 3-0; Department of the Army, Field Manual (FM) 3-0 with Change 1 (2017), *Operations* (Washington, DC: Government Publishing Office, 2017); Department of the Army, Army Doctrine Publication (ADP) 3-90, *Offense and Defense* (Washington, DC: Government Publishing Office, 2019).

Operations.[35] Protection includes ADP 3-37 *Protection* and FM 3-11 *Chemical, Biological, Radiological, and Nuclear Operations*.[36] Only ADP 2-0 *Intelligence* is used for the intelligence WfF since FM 2-0 *Intelligence* is restricted to "For Official Use Only" functions only.[37] The manuals used for sustainment are ADP 4-0 *Sustainment* and FM 4-0 *Sustainment Operations*.[38] Finally, ADP 6-0 *Mission Command: Command and Control of Army Forces*, FM 6-0 *Commander and Staff Organization and Operations*, and FM 6-02 *Signal Support to Operations* are used for the command and control WfF.[39]

Outside of the warfighting function categorization, there are another three important current manuals. Two pertain to training: FM 7-100.1 *Opposing Force Operations*, and FM 7-0 *Train to Win in a Complex World*.[40] The latter provides primarily tactical-level advice on how to best train Army units and personnel. The former establishes the all-encompassing doctrine for the Army's notional enemy in training events. This document is especially helpful in determining what the Army's current view of the enemy is, since named adversaries or enemies are rarely mentioned in current doctrine. The third manual is actually a Training and Doctrine Command

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[35] Department of the Army, Army Doctrine Publication (ADP) 3-19, *Fires* (Washington, DC: Government Publishing Office, 2019); Department of the Army, Field Manual (FM) 3-09, *Fire Support and Field Artillery Operations* (Washington, DC: Government Publishing Office, 2020).

[36] Department of the Army, Army Doctrine Publication (ADP) 3-37, *Protection* (Washington, DC: Government Publishing Office, 2019); Department of the Army, Field Manual (FM) 3-11, *Chemical, Biological, Radiological, and Nuclear Operations* (Washington, DC: Government Publishing Office, 2019).

[37] Department of the Army, Army Doctrine Publication (ADP) 2-0, *Intelligence* (Washington, DC: Government Publishing Office, 2019).

[38] Department of the Army, Army Doctrine Publication (ADP) 4-0, *Sustainment* (Washington, DC: Government Publishing Office, 2019); Department of the Army, Field Manual (FM) 4-0, *Sustainment Operations* (Washington, DC: Government Publishing Office, 2019).

[39] Department of the Army, Army Doctrine Publication (ADP) 6-0, *Mission Command: Command and Control of Army Forces* (Washington, DC: Government Publishing Office, 2019); Department of the Army, Field Manual (FM) 6-0 with Change 1 (2015) and Change 2 (2016), *Command and Staff Organization and Operations* (Washington, DC: Government Publishing Office, 2014); Department of the Army, Field Manual (FM) 6-02, *Signal Support to Operations* (Washington, DC: Government Publishing Office, 2019).

[40] Department of the Army, Field Manual (FM) 7-100.1, *Opposing Force Operations* (Washington, DC: Government Printing Office, 2004); Department of the Army, Field Manual (FM) 7-0, *Train to Win in a Complex World* (Fort Belvoir, Army Publishing Directorate, 2016).

pamphlet, TRADOC PAM 525-3-1 *The US Army in Multi-Domain Operations 2028*.[41] Similar to some of the later historical doctrine, this pamphlet specifically names China and Russia as "strategic competitors" and uses them to juxtapose how the Army must transform in the near future.[42] Collectively, these three documents help guide leaders in how they should train their units for the anticipated future.

Not all current doctrine is used to assess both criteria sets. For the first criteria set concerning the operating environment, five doctrinal sources are used: FM 3-94 *Theater Army, Corps, and Division Operations*; ADP 3-0 *Operations*; FM 7-0 *Train to Win in a Complex World*; FM 7-100.1 *Opposing Force Operations*; and TRADOC PAM 525-3-1 *The US Army in Multi-Domain Operations 2028*. These five documents fit this criteria set best for three reasons. First, FM 3-94 and ADP 3-0 are the capstone documents for operations at the echelon this monograph is concerned with, thus they establish the fundamental foundation for how divisions and larger units fight. Second, FM 7-0 and FM 7-100.1 are concerned with training. Training is meant to prepare units to fight, and together the two FMs help layer friendly doctrine with an anticipated enemy. Third, TRADOC PAM 525-3-1 anticipates the near future, thereby shaping the direction of change within the Army.

Unlike current doctrine, all historical manuals examined in depth are used to assess all components of both criteria. These manuals include FM 100-5's 1954, 1962, 1968, 1976, 1982, and 1986 versions, FM 100-15's 1950, 1963, and 1989 versions, FM 61-100 from 1962, and FM 71-100 from 1990.

At the beginning of each question in the operational environment criteria and for all six warfighting functions in the second criteria set there is a companion table generated by the author (see the Tables index on page viii for a complete list). These tables organize the relevant doctrine

[41] Department of the Army, Training and Doctrine Command Pamphlet (TRADOC PAM) 525-3-1, *The US Army in Multi-Domain Operations 2028* (Fort Eustis, VA: n.p., 2018).

[42] US Army, TRADOC PAM 525-3-1, i.

by period (historical or current), and further organize them by doctrinal series and year. For the first criteria set about the operating environment, the tables answer the question posed. For the second criteria set regarding warfighting functions, the tables identify themes and categorize the relevant manuals regarding those themes. All tables are designed to quickly show consensus, or a lack of consensus, across time-periods and/or doctrinal series.

Results and Analysis

Criteria Set 1: Assumptions About the Operating Environment

Does Doctrine Anticipate a Nuclear Battlefield?

Criteria Set 1	Historical Doctrine											Current Doctrine				
	FM 100-5						FM 100-15			FM 61/71-100		FM 3-94	ADP 3-0	FM 7-0	FM 7-100.1	TP 525-3-1
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2014	2019	2016	2004	2018
Does doctrine anticipate a nuclear environment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No

Table 1. Results for Does Doctrine Anticipate a Nuclear Battlefield. *Source*: Created by author.

From 1954-1986, the FM 100-5 *Operations* series anticipates a nuclear battlefield in all six versions of the series.[43] The understanding in the 1950s and 1960s was that a nuclear war would be a component of "general war" in which nuclear powers used all available means to ensure national survival.[44] However, by the 1980s, the doctrine speaks to a far higher probability of a nuclear battlefield. The 1982 version states the Army "must anticipate battles fought with nuclear and chemical weapons," which the 1986 version echoes."[45]

Of the five manuals examined in depth in the FM 100-15 *Larger Units* / *Corps* and FM 61-100 *The Division* and 71-100 *Division Operations* series, all five anticipate a nuclear

[43] US Army, FM 100-5 (1954), 40; US Army, FM 100-5 (1962), 4-6; US Army, FM 100-5 (1968), 1-1, 1-3; US Army, FM 100-5 (1976), 10-1; US Army, FM 100-5 (1982), 1-1; US Army, FM 100-5 (1986), i, 1.

[44] US Army, FM 100-5 (1962), 4-6.

[45] US Army, FM 100-5 (1982), 1-1; US Army, FM 100-5 (1986), i.

environment.[46] 1962's FM 61-100 not only anticipates a nuclear battlefield, but states such an environment is the default when it says "this manual covers division level operations under active or nonactive nuclear conditions. When appropriate, modifying guidance for nonnuclear warfare is included."[47] The tone in 1990 is significantly softened, stating a nuclear threat is merely one "condition of warfare."[48] Yet within both series, there is a firm consensus that divisions and larger tactical units must prepare for a nuclear battlefield as a very real possibility.

Current doctrine does not anticipate a nuclear battlefield. Of all five documents examined, none of them anticipate a nuclear environment. ADP 3-0 *Operations* does state that some peers have nuclear weapons, but relegates use of them as unlikely and, if so, only for strategic and not tactical purposes.[49] Even the forward leaning FM 7-0 *Train and Win in a Complex World* and TRADOC PAM 525-3-1 *The US Army in Multi-Domain Operations 2028* give scant attention to a nuclear battlefield. The latter even bluntly states as one of its fundamental assumptions, "neither the US nor adversaries will employ nuclear weapons."[50] FM 7-0 also explicitly defines potential threats as conventional and irregular, not nuclear.[51]

The historical consensus to this question is clear; Cold War doctrine anticipates a nuclear battlefield. While the probability declined throughout the period, it remained high enough to generically plan for even in the late 1980s. Current doctrine, while it does acknowledge the low probability of such an event occurring, holistically does not anticipate a nuclear battlefield. The opposite stances are a glaring difference.

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[46] US Army, FM 100-15 (1950), 25, 69; US Army, FM 100-15 (1963), 3; US Army, FM 100-15 (1989), 6-1; US Army, FM 61-100 (1962), 4; US Army, FM 71-100 (1990), 1-21, 1-22, E-1.

[47] US Army, FM 61-100 (1962), 4.

[48] US Army, FM 71-100 (1990), 1-21 to 1-22.

[49] US Army, ADP 3-0, 1-2.

[50] US Army, TRADOC PAM 525-3-1, A-1

[51] US Army, FM 7-0 (2016), 1-1.

Does Doctrine Discuss the Aspects of a Nuclear Environment?

Criteria Set 1	Historical Doctrine											Current Doctrine				
	FM 100-5						FM 100-15			FM 61/71-100		FM 3-94	ADP 3-0	FM 7-0	FM 7-100.1	TP 525-3-1
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2014	2019	2016	2004	2018
Does doctrine discuss the aspects of a nuclear environment?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes

Table 2. Results for Does Doctrine Discuss the Aspects of a Nuclear Environment. *Source*: Created by author.

FM 100-5 *Operations* discusses a nuclear environment in depth. All six versions of the series include nuclear discussions interlaced throughout the versions or have stand-alone nuclear sections.[52] Specifically, the versions compare nuclear and nonnuclear environments relative to the linked concepts of dispersion and combat power. Because nuclear weapons provide "instantaneously crippling combat power," the Army must disperse its forces wide enough to ensure as many as possible can survive.[53] The differences between the environments are so vast that the 1962 version bluntly states that "operations of an environment conditioned-by mass destruction weapons cannot be blindly employed in a situation where such weapons are not employed."[54]

Within the FM 100-15 *Larger Units* / *Corps* and FM 61-100 *The Division* and 71-100 *Division Operations* series, only four of the five manuals discuss the aspects of a nuclear environment.[55] The lone dissenter is FM 100-15's 1950 version, likely due to the newness of nuclear weapons and a lack of imagination in envisioning a battlefield populated by them. The *Division* series continues the tension between dispersion and combat power, favoring dispersion

[52] US Army, FM 100-5 (1954), 40; US Army, FM 100-5 (1962), 2, 3, 59-62; US Army, FM 100-5 (1968), 2-3, 6-1 to 6-3; US Army, FM 100-5 (1976), 2-28, 2-29; US Army, FM 100-5 (1982), 1-3; US Army, FM 100-5 (1986), 3.

[53] US Army, FM 100-5 (1976), 10-5.

[54] US Army, FM 100-5 (1962), 15 and 18.

[55] US Army, FM 100-15 (1963), 24, 25; US Army, FM 100-15 (1989), 3-11, 3-12; US Army, FM 61-100 (1962), 95; US Army, FM 71-100 (1990), 1-22.

in a nuclear environment and massing combat power in a nonnuclear one.[56] FM 100-15's emphasis on a nuclear environment is less descriptive and more prescriptive than the other two series. Unsurprisingly as a manual for the largest tactical formations, FM 100-15 discusses the relationship of fire and maneuver, the two basic elements of tactics. In 1963, the series clearly states how the predominance of one element over the other switches in a nuclear environment, saying

> "In nonnuclear operations maneuver is the dominant element. The commander plans his scheme of maneuver and develops the fire plan to support it. In nuclear operations initially nuclear firepower may dominate the battlefield. In this case, the commander may plan the employment of his nuclear weapons and develop the scheme of maneuver to exploit the nuclear fires."[57]

Current doctrine does not deeply explore the aspects of a nuclear environment. While three of the five documents discussion the aspects of a nuclear environment in some detail, only FM 7-100.1 *Opposing Forces Operations* does so beyond a precursory level.[58] It includes a significant section on nuclear warfare, including a general emphasis on dispersion of all forces and specifics on triggers to employ low-yield nuclear battlefield weapons and offensive and defensive employment.[59] ADP 3-0 Operations emphasizes "dispersion, survivability, and regenerating communications between echelons," but does so in only a single paragraph.[60] TRADOC PAM 525-3-1 *The US Army in Multi-Domain Operations 2028* underperforms even ADP 3-0 by mentioning non-strategic nuclear considerations in only two sentences that dispel the idea of vanquishing an opponent in favor of culmination because of "some combination of policy, logistics, and resource constraints."[61]

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[56] US Army, FM 61-100 (1962), 95; US Army, FM 71-100 (1990), 1-22.

[57] US Army, FM 100-15 (1963), 24-25.

[58] US Army, ADP 3-0, 1-2; US Army, FM 7-100.1, 11-7 to 11-10; US Army TRADOC PAM 525-3-1, 44, 45.

[59] US Army, FM 7-100.1 (2004), 11-7 to 11-10.

[60] US Army, ADP 3-0, 1-2.

[61] US Army, TRADOC PAM 525-3-1, 44 and 45.

The historical consensus revolves around dispersion and combat power, which influence maneuver and fires. In a nuclear environment, the importance of dispersion drastically increases because of the increased combat power, applied through a heavier dose of fires vice maneuver. Current doctrine somewhat concurs on dispersion, but not on fires. The difference in the importance of fires likely derives from the denuclearization of the Army in the 1990s. With that change taken into account, there is a minor degree of similarity between historical and current doctrine regarding this question.

Does Doctrine Anticipate Enemy Use of Nuclear Weapons?

Criteria Set 1	Historical Doctrine											Current Doctrine				
	FM 100-5						FM 100-15			FM 61/71-100		FM 3-94	ADP 3-0	FM 7-0	FM 7-100.1	TP 525-3-1
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2014	2019	2016	2004	2018
Does the doctrine anticipate enemy use of nuclear weapons?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes

Table 3. Results for Does Doctrine Anticipate Enemy Use of Nuclear Weapons. *Source*: Created by author.

FM 100-5 *Operations* anticipates enemy use of nuclear weapons in all six of its versions.[62] In the 1954 version, a nuclear attack is listed as the fifth of seven security threats the Army must prepare for.[63] The 1968 version clearly states opposing forces will use nuclear weapons, which couples with the 1976 version's statement that "Warsaw Pact doctrine anticipates use of nuclear weapons in future wars."[64] Yet by the 1980s, there is more emphasis on chemical rather than nuclear attacks, but the two versions of that decade still maintain the Soviet capability, willingness, and low threshold to use nuclear weapons.[65]

[62] US Army, FM 100-5 (1954), 118; US Army, FM 100-5 (1962), 5; US Army, FM 100-5 (1968), 1-7, 2-2; US Army, FM 100-5 (1976), 2-2, 10-2; US Army, FM 100-5 (1982), 1-3, 4-1; US Army, FM 100-5 (1986), 3, 33, 35, 85.

[63] US Army, FM 100-5 (1954), 56.

[64] US Army, FM 100-5 (1968), 2-2; US Army, FM 100-5 (1976), 2-2.

[65] US Army, FM 100-5 (1982), 1-3, 4-1, 7-2; US Army, FM 100-5 (1986), 3, 85, 171.

Enemy use of nuclear weapons is anticipated in all five versions of the FM 100-15 *Larger Units* / *Corps* and FM 61-100 *The Division* and 71-100 *Division Operations* series.[66] They do so primarily as lists of tasks friendly units must perform, such as "all divisions can— (1) Perform ground operations under conditions of nuclear or nonnuclear warfare," or as lists of threats, such as nuclear fires.[67] A late version of FM 100-15 also specifically references nuclear employment as part of Soviet doctrine, similar to FM 100-5.[68]

Current doctrine does not anticipate enemy use of nuclear weapons. Four of the five documents either do not even mention enemy nuclear employment or they distinguish between capability and intent.[69] ADP 3-0 *Operations* maintains "it is generally presumed that most [nuclear capable states] would use restraint," but qualifies this statement by saying forces must consider their use when facing a nuclear adversary.[70] TRADOC PAM 525-3-1 *The US Army in Multi-Domain Operations 2028* is the lone dissenter of current doctrine. While it agrees in principle with the prior current doctrine, it specifically identifies Russia as a potential nuclear employer, particularly if a Russian opponent has "achieved a military advantage, the use or threat of Russian nuclear systems becomes an important element."[71]

The historical consensus is clear that enemy use is anticipated. While theoretically possible, current doctrine concludes enemy use is unlikely. Even with one exception to current doctrine, the conclusions of the historical and current doctrines concerning enemy use of nuclear weapons are opposites.

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[66] US Army, FM 100-15 (1950), 18, 69; US Army, FM 100-15 (1963), 9; US Army, FM 100-15 (1989), 3-11, 3-12; US Army, FM 61-100 (1962), 6, 71; US Army, FM 71-100 (1990), 1-22, 4-5.

[67] US Army, FM 61-100 (1962), 6; US Army, FM 71-100 (1990), 4-1.

[68] US Army, FM 100-15 (1989), 3-3, E-0.

[69] US Army, TRADOC PAM 525-3-1, 14.

[70] US Army, ADP 3-0, 1-1.

[71] US Army, TRADOC PAM 525-3-1, 14.

Does Doctrine Anticipate Friendly Use of Nuclear Weapons?

Criteria Set 1	Historical Doctrine											Current Doctrine				
	FM 100-5						FM 100-15			FM 61/71-100		FM 3-94	ADP 3-0	FM 7-0	FM 7-100.1	TP 525-3-1
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2014	2019	2016	2004	2018
Does the doctrine anticipate friendly use of nuclear weapons?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No

Table 4. Results for Does Doctrine Anticipate Friendly Use of Nuclear Weapons. *Source*: Created by author.

FM 100-5 *Operations* views nuclear weapons as an extreme form of fire support, and thus endorses friendly use of nuclear weapons in all six versions.[72] However, there is an important qualitative change throughout the series. The 1954 version states that nuclear fires should be considered from field army down to even company level.[73] By 1976, the endorsement of nuclear use is still clear, but "the first use of US tactical nuclear weapons would probably be in a defensive mode based on prepared defense plans."[74] Ten years later, the use of friendly nuclear weapons at the tactical level is unlikely, with employment "guided more by political and strategic objectives than by the tactical effect."[75] Essentially, this series maintains the right to use nuclear weapons throughout the Cold War, but significantly decrease the likelihood of their employment over time.

The declining probability of nuclear employment within FM 100-5 is not present in FM 100-15 *Larger Units* / *Corps* and FM 61-100 *The Division* and 71-100 *Division Operations*. In fact, those manuals become more detailed concerning nuclear employment as the Cold War ages. All five manuals concur with FM 100-5 on the friendly use of nuclear weapons.[76] In the 1960s,

[72] US Army, FM 100-5 (1954), 89, 92, 96; US Army, FM 100-5 (1962), 7-9; US Army, FM 100-5 (1968), 1-4, 1-7; US Army, FM 100-5 (1976), 10-2, 10-8; US Army, FM 100-5 (1982), 1-1; US Army, FM 100-5 (1986), 3, 29, 38.

[73] US Army, FM 100-5 (1954), 124-5.

[74] US Army, FM 100-5 (1976), 10-8.

[75] US Army, FM 100-5 (1986), 29.

[76] US Army, FM 100-15 (1950), 18; US Army, FM 100-15 (1963), 17, 24, 25; US Army, FM 100-15 (1989), 1-1, 3-12, E-0; US Army, FM 61-100 (1962), 71, 72, 239; US Army, FM 71-100 (1990), 1-22, E-1 to E-8.

the use of nuclear weapons is viewed as simply a general requirement for large scale offensive operations and includes few specific actions needed.[77] By 1989, "planning the employment of tactical nuclear weapons in support of campaign objectives" is listed as a critical role of a corps on the very first page of the manual.[78] This version does acknowledge the need for nuclear release from the National Command Authority, which mirrors the diminished probability of employment in FM 100-5's 1989 version.[79] However, FM 100-15 discusses the National Command Authority as merely part of the process for employment, not as a nearly insurmountable obstacle making nuclear use improbable.[80] Indeed, 1990's FM 71-100 called for the use of nuclear weapons during both offensive and defensive operations, with an entire "Division Nuclear Operations" appendix to meticulously guide staff sections.[81]

Current doctrine does not anticipate that the United States, let alone the Army, will use nuclear weapons. All five documents do not endorse, nor really even mention, American use of nuclear weapons. ADP 3-0 Operations did not even include friendly nuclear employment as a consideration. The only substantial exception is the mention of Nuclear Employment Augmentation Teams (NEATs) in FM 3-94 *Theater Army, Corps, and Division Operations*. In FM 3-94, NEATs are described as available upon request to "augment the planning staff of a corps or echelons above corps for adaptive nuclear planning at the commander's request…The NEAT provides the supported commander with independent analysis theater nuclear plans to ensure that these plans are synchronized with ground operations."[82] Yet two paragraphs in one manual discussing how to obtain nuclear employment planners is hardly enough to shake the current doctrinal consensus.

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[77] US Army, FM 100-15 (1963), 29; US Army, FM 61-100 (1962), 71-72.

[78] US Army, FM 100-15 (1989), 1-1.

[79] US Army, FM 100-15 (1989), 3-12.

[80] US Army, FM 100-15 (1989), 3-12.

[81] US Army, FM 71-100 (1990), Appendix E.

[82] US Army, FM 3-94, 5-17 to 5-18.

Current and historical doctrine stand in direct contradiction regarding friendly use of nuclear weapons. Historical doctrine treats nuclear employment similarly to any other type of fires, while current doctrine does not consider any nuclear employment. The difference is likely due to the Army's denuclearization after the Cold War, with NEATs as a minor exception.

How Long Does Doctrine Anticipate Nuclear Combat Lasting?

Criteria Set 1	Historical Doctrine											Current Doctrine				
	FM 100-5						FM 100-15			FM 61/71-100		FM 3-94	ADP 3-0	FM 7-0	FM 7-100.1	TP 525-3-1
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2014	2019	2016	2004	2018
How long does doctrine anticipate a nuclear environment lasting?		Short (days)	Short (days)	Shorter (hours)	Hours	Hours	Shorter, but not directly addressed									

Table 5. Results for How Long Does Doctrine Anticipate Nuclear Combat Lasting. *Source*: Created by author.

The FM 100-5 Operations series generally anticipates a short nuclear environment.[83] The 1954 series does not address time, but from 1962 onwards the versions explicitly state short nuclear environments. The two 1960s versions include the identical assertions that "the results of an engagement are determined in far less time than would otherwise be required"[84] and nuclear "operations can be expected to be of relatively short duration."[85] The 1980s versions share similar language that specifies fighting lasting "hours instead of days or weeks."[86] The other two doctrinal series, FM 100-15 *Larger Units* / *Corps* and FM 61-100 *The Division* and 71-100 *Division Operations*, do not make any meaningful conclusions regarding the length of a nuclear engagement. Similarly, current doctrine makes no statements concerning the length of nuclear engagements, making the comparison with historical doctrine futile.

[83] US Army, FM 100-5 (1962), 3, 18, 96; US Army, FM 100-5 (1968), 2-3, 6-30; US Army, FM 100-5 (1976), 10-5; US Army, FM 100-5 (1982), 1-3; US Army, FM 100-5 (1986), 3.

[84] US Army, FM 100-5 (1962), 18; US Army, FM 100-5 (1968), 2-3.

[85] US Army, FM 100-5 (1962), 96; US Army, FM 100-5 (1968), 6-30.

[86] US Army, FM 100-5 (1982), 1-3; US Army, FM 100-5 (1986), 3.

Criteria Set 2: Friendly Tactical Considerations

Movement and Maneuver Warfighting Function

Movement and Maneuver	Historical Doctrine											Current Doctrine			
	FM 100-5						FM 100-15			FM 61/71-100		ADP 3-0	FM 3-0	ADP 3-90	FM 3-94
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2019	2017	2019	2014
Increased Dispersion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Enhanced Mobility	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes					
Defense: Mobile vs Area	Mobile	Mobile	Mobile		Mobile	Mobile	Mobile	Mobile		Mobile					
Offense: Hasty vs Deliberate	Hasty	Hasty	Hasty		Hasty	Hasty									
Force Compo: Light, Heavy, Balance	Heavy	Heavy	Heavy	Heavy				Heavy	Heavy	Heavy	Heavy			Heavy	
Offensive Nuclear Use	Yes	Yes	Yes	Yes	Yes	Yes		Yes	No	Yes	Yes	No	No	No	No
Defensive Nuclear Use	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	No	No	No	No
Reserve Size	Smaller				Larger			Larger		Smaller					

Table 6. Results for Movement and Maneuver Warfighting Function. *Source*: Created by author.

Eight themes emerged from a scan of the nuclear discussions within historical doctrine's movement and maneuver WfF. Of them, seven emerge with strong consensuses: increased dispersion, enhanced mobility, the preference for a mobile, the preference for hasty offenses, preference for heavy units, and the endorsement for both offensive and defensive nuclear use. The final theme, the size of the reserve, does not have a consensus.

Concerning dispersion, ten of the eleven historical manuals advocate for increased dispersion on a nuclear battlefield relative to a nonnuclear one.[87] The remaining manual does not address dispersion on a nuclear battlefield enough to make a conclusion. In general, dispersion is viewed as a survival tactic, with dispersion "generally proportional to the level of employment of nuclear weapons."[88] Dispersion on a nuclear battlefield entails more than simply spacing out units, which naturally leads to larger areas of operation, but also entails using more avenues of

[87] US Army, FM 100-5 (1954), 80; US Army, FM 100-5 (1962), 59-61; US Army, FM 100-5 (1968), 6-7; US Army, FM 100-5 (1976), 10-5; US Army, FM 100-5 (1982), 7-9; US Army, FM 100-5 (1986), 77-78; US Army, FM 100-15 (1950), 25; US Army, FM 100-15 (1963), 31, 38; US Army, FM 100-15 (1989), 6-6; US Army, FM 61-100 (1962), 65, 70, 81, 128, 129.

[88] US Army, FM 100-5 (1962), 59-61.

approach, including the use of secondary roads and even cross-country movement.[89] Current doctrine does not sufficiently address dispersion on a nuclear battlefield to make any conclusions.

Pairing with increased dispersion is enhanced mobility. The historical doctrine has eight of the eleven manuals encouraging more emphasis on mobility in a nuclear environment, with the remaining manuals lacking enough content on the topic for a conclusion.[90] In 1954, FM 100-5 recognizes that "an enemy atomic capability increases the necessity of efficient troop movement" as a protective measure of movement and maneuver.[91] A later version of the same series identifies that when combined with nuclear employment a smaller mobile force can achieve the same effects as a larger force without the same nuclear-mobility combination.[92] Like dispersion, current doctrine is mum on the topic.

With the aforementioned emphasis on dispersion and mobility, the consensus historical view is decidedly in favor of a mobile defense and hasty attacks when on a nuclear battlefield. Seven of the eleven manuals support a mobile defense over an area one, with the remaining four manuals not discussing the distinction enough for a conclusion.[93] For offensive operations, only the FM 100-5 *Operations* series addresses the topic enough to draw a conclusion, with all five that address the topic supporting hasty over deliberate attacks.[94] Deliberate attacks are viewed as "usually unnecessary" on a nuclear battlefield, with the desire to maintain momentum through

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[89] US Army, FM 100-15 (1963), 52; US Army, FM 61-100 (1962) 70, 250.

[90] US Army, FM 100-5 (1954), 3, 4, 62; US Army, FM 100-5 (1962), 15; US Army, FM 100-5 (1968), 2-3; US Army, FM 100-5 (1982), 9-5, 9-6; US Army, FM 100-5 (1986), 114; US Army, FM 100-15 (1963), 31, 58, 59; US Army, FM 100-15 (1989), 6-6; US Army, FM 61-100 (1962), 92, 134, 135.

[91] US Army, FM 100-5 (1954), 62.

[92] US Army, FM 100-5 (1986), 123.

[93] US Army, FM 100-5 (1954), 3, 4, 214; US Army, FM 100-5 (1962), 17, 18, 75, 75; US Army, FM 100-5 (1968), 6-14; US Army, FM 100-5 (1982), 12-7, 12-8; US Army, FM 100-5 (1986), 155; US Army, FM 100-15 (1963), 51, 52; US Army, FM 61-100 (1962), 134, 135, 161.

[94] US Army, FM 100-5 (1954), 2; US Army, FM 100-5 (1962), 64, 69, 70, 73; US Army, FM 100-5 (1968), 6-10; US Army, FM 100-5 (1982), 2-9, 8-8; US Army, FM 100-5 (1986), 98, 116.

rapid attacks that achieve local superiority.[95] Current doctrine does not address either the offense or the defense on a nuclear battlefield to choose favorites.

The historical consensus is that the best units to conduct mobile defenses and hasty attacks on a nuclear battlefield are heavy units.[96] In this context, heavy units are units that are predominantly based upon armored vehicles, such as armor and mechanized units. The speed, organic firepower, and relative protection from nuclear side effects (i.e., radiation) make these types of units significantly better than dismounted or lightly armored mobile units.[97] On this topic, current doctrine has something to say, albeit little. ADP 3-90 *Offense and Defense* is the only current manual that addresses the topic enough to draw a conclusion. However, ADP 3-90 concurs with the historical doctrine by recommending armor and Stryker units for a potential nuclear battlefield.[98]

Offensive and defensive friendly nuclear employment, as a component of movement and maneuver, has a strong historical doctrinal consensus. For both themes, ten of the eleven historical manuals address the topics, with nine supporting offensive use and all ten supporting defensive use.[99] Defensively, nuclear employment is a way to not only destroy enemy forces, but also to create time and space to support mobile defenses.[100] Yet the tone of defensive use is significantly softened in 1989's FM 100-15 *Corps Operations* to such an extent that, while still

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[95] US Army, FM 100-5 (1962), 69-70; US Army, FM 100-5 (1968), 6-10; US Army, FM 100-5 (1982), 8-5 to 8-6.

[96] US Army, FM 100-5 (1954), 2, 16; US Army, FM 100-5 (1962), 35; US Army, FM 100-5 (1968), 4-8; US Army, FM 100-5 (1976), 2-2, 2-10; US Army, FM 100-15 (1963), 52; US Army, FM 100-15 (1989), 6-6; US Army, FM 61-100 (1962), 6, 7, 76, 77; US Army, FM 71-100 (1990), Appendix C, Appendix D.

[97] US Army, FM 100-5 (1962), 6-7; US Army, FM 100-5 (1968), 4-8.

[98] US Army, ADP 3-90, 4-5, 4-10, 4-17.

[99] US Army, FM 100-5 (1954), 2, 3; US Army, FM 100-5 (1962), 17, 74-76; US Army, FM 100-5 (1968), 6-12 to 6-14, 6-17; US Army, FM 100-5 (1976), 2-28, 3-4, 10-5; US Army, FM 100-5 (1982), 9-17, 10-3; US Army, FM 100-5 (1986), 119, 151; US Army, FM 100-15 (1963), 32, 48; US Army, FM 100-15 (1989), 6-3, 6-6, 6-8, 7-5; US Army, FM 61-100 (1962), 72, 75, 134, 135; US Army, FM 71-100 (1990), E-2.

[100] US Army, FM 100-15 (1963), 58-59; US Army, FM 100-15 (1989), 7-5

permitted, use is almost discouraged.[101] That same manual is the lone dissenting manual on offensive use.[102] Similarly, FM 71-100 *Division Operations'* 1990 version highly discourages offensive use, but it does not outright refute the right to do so.[103] Current doctrine's absence of comment the topic is a tacit discouragement of friendly nuclear use. Unlike the previous themes, the absence of such discussion is assumed to endorse non-employment.

The final theme of reserve size is inconclusive historically and not addressed in current doctrine. Of the four historical manuals that do specifically address reserves on a nuclear battlefield, they are evenly split between advocating for larger and smaller reserves.[104] The argument in favor of larger reserves revolves around the increased fluidity and unpredictability of a nuclear battlefield. The case for a smaller reserve centers on nuclear weapons replacing troops normally allocated to the reserve. If there is a consensus about the reserve on a nuclear battlefield, three of the four manuals encourage the inclusion of nuclear weapons as part of the reserve.[105]

The historical census for movement and maneuver on a nuclear battlefield centers upon dispersion, mobility, and armor. The three items are linked. Dispersion is for survivability against an enemy nuclear attack, mobility allows for dispersed units to mass quickly for operations, and armored units have the best mobility and protection of Army units. Mobile defenses, and operations with high tempos, such as hasty attacks, align with these principles. Current doctrine speaks only to non-light units, making the emphasis on armored units the most common element between current and historical doctrine.

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[101] US Army, FM 100-15 (1989), 6-8.

[102] US Army, FM 100-15 (1989), 6-8.

[103] US Army, FM 71-100 (1990), E-2.

[104] US Army, FM 100-5 (1954), 12; US Army, FM 100-5 (1982), 11-8 to 11-9; US Army, FM 100-15 (1963), 29; US Army, FM 61-100 (1962), 72.

[105] US Army, FM 100-5 (1954), 12; US Army, FM 100-15 (1963), 29, 51; US Army, FM 61-100 (1962), 72, 76, 101.

Fires Warfighting Function

Fires	Historical Doctrine											Current Doctrine		
	FM 100-5						FM 100-15			FM 61/71-100		ADP 3-19	FM 3-09	FM 3-94
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2019	2020	2014
Main or Supporting Effort	ME/SE	SE	ME/SE		SE	SE		SE	SE	SE	SE	SE	SE	
Part of the Reserve	No	Yes	Yes		Yes					Yes			No	
Centralize or Decentralize	Cent	Decent	Decent	Cent	Cent	Cen		Decent	Cent	Decent	Cent			

Table 7. Results for Fires Warfighting Function. *Source*: Created by author.

Discussions on fires within the historical doctrine take on a surreal degree of normalcy to the modern reader, assert that "there are no purely nuclear targets."[106] Nuclear fires are discussed in all the historical documents as essentially larger artillery; where a single weapon is just as effective against troops in the open and at least twenty times as effective against tanks and entrenched troops as a division's entire artillery.[107] Yet there are three clear topics: whether fires can be the main effort, whether fires should be part of the reserve, and whether to centralize fires.

Concerning the main effort versus supporting effort debate, the historical and current consensuses conclude the WfF as the supporting effort to maneuver. Of the nine historical manuals that addressed the topic, seven unambiguously affirm the supporting effort argument, while the remaining two admit there are specific situations where fires could be the main effort.[108] The two dissenting manuals, the 1954 and 1968 versions of FM 100-5 *Operations,* are in the first half of the Cold War period, suggesting that the theory and doctrine of nuclear fire support was not fully developed. Additionally, they state that the periods when fires becomes the main effort are short, leading them to essentially support the consensus positions outside of

[106] US Army, FM 71-100 (1990), E-2.

[107] US Army, FM 100-5 (1976), 10-3.

[108] US Army, FM 100-5 (1954), 2, 3, 75, 96; US Army, FM 100-5 (1962), 59-61, 99; US Army, FM 100-5 (1968), 6-9; US Army, FM 100-5 (1982), 2-4, 7-3, 7-12, 7-15; US Army, FM 100-5 (1986), 38, 43, 45, 157; US Army, FM 100-15 (1963), 24, 25, 43, 46, 48; US Army, FM 100-15 (1989), 3-12, B-2; US Army, FM 61-100 (1962), 85, 86, 101; US Army, FM 71-100 (1990), E-2.

precise exceptions.[109] Within current doctrine, the two fires-only manuals, ADP 3-19 *Fires* and FM 3-09 *Fire Support and Field Artillery Operations*, align with the historical consensus. While these manuals do not address nuclear fires, they firmly assert that the fires WfF is never the main effort.[110]

Current doctrine is at odds with the historical doctrine concerning the topics of fires, particularly nuclear fires, as part of a reserve force. FM 3-09 clearly states, "never place artillery in the reserve," while four of the five manuals that specifically address nuclear fires take the opposite stance.[111] However, the entire FM 100-15 *Larger Units / Corps* does not even address the topic, calling the validity of the historical consensus into question.

The debate about whether to centralize or decentralize nuclear fires is inconclusive collectively, but shows a clear trend over time. Of the ten manuals that address the topic, there is a four to six split on advocating decentralization vice centralization, respectively.[112] All three series follow the trend of advocating decentralization, even down to the battalion level, in the 1960s, particularly when "the battle becomes more fluid."[113] By the closing years of the Cold War, all three series shift their focus to processes, unsurprisingly leading to the centralization of nuclear fires.[114] Yet what all versions do agree upon is that divisions and higher should create plans that "permit but [do] not depend upon nuclear weapons employment" for success.[115]

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[109] US Army, FM 100-5 (1954), 2, 3, 75, 96; US Army, FM 100-5 (1968), 6-9.

[110] US Army, ADP 3-19, v; US Army, FM 3-09, 4-6.

[111] US Army, FM 100-5 (1954), 17; US Army, FM 100-5 (1962), 68; US Army, FM 100-5 (1968), 6-9; US Army, FM 100-5 (1982), 11-8; US Army, FM 61-100 (1962), 140, 154, 163, 164; US Army, FM 3-09, vii, 4-6, 4-7.

[112] US Army, FM 100-5 (1954), 89; US Army, FM 100-5 (1962), 36, 38, 68; US Army, FM 100-5 (1968), 4-9; US Army, FM 100-5 (1976), 10-9; US Army, FM 100-5 (1982), 7-12, 12-5; US Army, FM 100-5 (1986), 45, 151; US Army, FM 100-15 (1963), 43, 44; US Army, FM 100-15 (1989), 2-1, 3-12; US Army, FM 61-100 (1962), 26, 27, 33, 34, 306; US Army, FM 71-100 (1990), E-5, E-6.

[113] US Army, FM 100-5 (1962), 36; US Army, FM 100-5 (1968), 4-9; US Army, FM 61-100 (1962), 26-27, 33-34, 306.

[114] US Army, FM 100-15 (1989), 3-12; US Army, FM 100-5 (1986), 45, 123; US Army, FM 100-15 (1963), 44; US Army, FM 100-15 (1989), 2-1

[115] US Army, FM 100-5 (1986), 45, 123.

Of the three fires WfF topics, only one, fires as a supporting effort, has a consensus historically. Current doctrine supports this consensus, but the other two topics find little common ground between current and historical doctrine. The consensus within the historical doctrine determined by time, early or late Cold War, is likely a manifestation of changing fire support theory throughout the era.

Protection Warfighting Function

Protection	Historical Doctrine											Current Doctrine		
	FM 100-5						FM 100-15			FM 61/71-100		ADP 3-37	FM 3-11	FM 3-94
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2019	2019	2014
Dispersion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hardening	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes
Air Defense	Yes	Yes	Yes			Yes			Yes	Yes	Yes	Yes		Yes
Nuke Use for Area Denial	Yes	Yes	Yes							Yes				

Table 8. Results for Protection Warfighting Function. *Source*: Created by author.

The protection WfF has a remarkable degree of continuity from the Cold War to today. A comparison of the doctrines highlighted three cross era themes and one unique aspect. First, dispersion is common to all fourteen manuals, current and historical.[116] This fact is unsurprising considering the amount of emphasis on dispersion within the movement and maneuver WfF and because dispersion is the simplest passive form of protection available to units ranging from a squad to a field army. Dispersion in these instances does not simply mean stringing units across vast distances indefinitely. The type of unit and time are a consideration best summed up by FM 100-5 *Operations'* 1954 version, to "not concentrate profitable targets for periods of time sufficient for the enemy to react."[117]

[116] US Army, FM 100-5 (1954), 59, 104; US Army, FM 100-5 (1962), 59-61; US Army, FM 100-5 (1968), 6-7; US Army, FM 100-5 (1976), 10-5; US Army, FM 100-5 (1982), 2-10, 4-4; US Army, FM 100-5 (1986), 77-78; US Army, FM 100-15 (1950), 25; US Army, FM 100-15 (1963), 31; US Army, FM 100-15 (1989), 6-6; US Army, FM 61-100 (1962), 70, 78, 173; US Army, FM 71-100 (1990), 4-5; US Army, ADP 3-37, 2-5; US Army, FM 3-11, 3-19, 3-21; US Army, FM 3-94, 4-12, 7-6, 7-7.

[117] US Army, FM 100-5 (1954), 104.

Hardening positions, including fortifying or locating within structures capable of resisting attacks of some degree, is the second theme. Of the eleven manuals that address hardening, including all three current relevant manuals, all eleven endorse hardening as a form of defense against nuclear attacks.[118] The three historical manuals that are not included are done so due to the non-specificity of their discussion; they discuss hardening as important for protection, but not specifically as a protective measure against a nuclear attack. The three current manuals avoid this fate by using the chemical, biological, radiological, and nuclear (CBRN) umbrella, though little of their commentary was directed specifically at nuclear.

Air defense is the third theme within the protection WfF concerning nuclear weapons. Only nine of the fourteen manuals explicitly discuss anti-nuclear air defense functions, but all nine of them endorse air defense.[119] Since most nuclear munitions are delivered through the air, the emphasis on air defense is intuitive. What is not intuitive, is the early endorsement for employing nuclear weapons for area denial. Only four manuals endorse the topic, with the remaining ten not discussing the topic at all.[120] While area denial through munitions is certainly not condemned in the other versions, the dropping of nuclear weapons to do such likely follows the more restrictive use of nuclear weapons as the Cold War progressed, a mentality that is maintained in current doctrine.

The historical consensus within the protection WfF revolves around passive protection measures, namely dispersion and hardening. Active measures include air defense employment

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[118] US Army, FM 100-5 (1954), 59; US Army, FM 100-5 (1962), 14; US Army, FM 100-5 (1976), 10-2, 10-5, 11-6; US Army, FM 100-5 (1982), 4-4, 14-1; US Army, FM 100-5 (1986), 85, 86; US Army, FM 100-15 (1950), 25; US Army, FM 61-100 (1962), 69, 78; US Army, FM 71-100 (1990), 4-5; US Army, ADP 3-37, 2-2; US Army, FM 3-11, 3-21; US Army, FM 3-94, 4-12.

[119] US Army, FM 100-5 (1954), 80; US Army, FM 100-5 (1962), 10; US Army, FM 100-5 (1968), 6-8; US Army, FM 100-5 (1982), 9-12; US Army, FM 100-5 (1986), 125; US Army, FM 100-15 (1989), 3-15, B-3; US Army, FM 61-100 (1962), 175, 176; US Army, FM 71-100 (1990), 4-5; US Army, ADP 3-37, 2-5; US Army, FM 3-94, 4-12.

[120] US Army, FM 100-5 (1954), 4; US Army, FM 100-5 (1962), 8, 9, 11, 13, 14, 91-94; US Army, FM 100-5 (1968), 4-10, 5-9, 6-19, 6-25 to 6-27; US Army, FM 61-100 (1962), 171.

and, for a short time, nuclear area denial. Current doctrine continues the active measure of air defense and the passive measure of dispersion. Even when considering the minor endorsement of nuclear area denial within the historical doctrine, there is quite a bit of similarity between historical and current protection doctrines.

Intelligence Warfighting Function

Intelligence	Historical Doctrine											Current Doctrine	
	FM 100-5						FM 100-15			FM 61/71-100		ADP 2-0	FM 3-94
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2019	2014
Anticipate Enemy Use		Yes	Yes	Yes	Yes	Yes			Yes	Yes		Yes	
Terrain Analysis					Yes	Yes			Yes			Yes	

Table 9. Results for Intelligence Warfighting Function. *Source*: Created by author.

Overall, the discussions on intelligence throughout all three historical series include few nuclear specifics. The most common theme is in reference to trying to anticipate enemy nuclear use, which appears in seven historical manuals, plus ADP 2-0 *Intelligence*.[121] An "aggressive intelligence effort" is specified as part of the defense against new enemy weapons, which translated into part of the 1962 division standard operating procedure template that specified any nuclear knowledge obtained from enemy prisoners of war must be "reported to the G2 immediately."[122] The importance of nuclear intelligence analysis generally grows throughout the three series. A 1976 version merely states that intelligence sections should consider enemy capabilities and intentions, while by 1989 the nuclear operations appendix of the division standard operating procedure template includes an entire intelligence section.[123] The most

[121] US Army, FM 100-5 (1962), 52; US Army, FM 100-5 (1968), 4-11; US Army, FM 100-5 (1976), 7-13; US Army, FM 100-5 (1982), 6-3; US Army, FM 100-5 (1986), 45; US Army, FM 100-15 (1989), 3-16, 3-17, B-3, E-4; US Army, FM 61-100 (1962), 28, 300; US Army, ADP 2-0, 1-5.

[122] US Army, FM 100-5 (1954), 60; US Army, FM 61-100 (1962), 28, 300.

[123] US Army, FM 100-5 (1976), 7-13; US Army, FM 100-15 (1989), E-4.

common aspect of intelligence across series and time is the need for accurate terrain analysis to inform nuclear vulnerability.[124]

ADP 2-0, as the paramount current intelligence manual, reflects much of the Cold War's intelligence doctrine. Like its predecessors, ADP 2-0 is limited in content, but includes catch-all phrases that encompasses nuclear analysis, such as "preparation and planning that consider nuclear and chemical weapons capabilities are of paramount importance in any confrontation with an adversary armed with them. Understanding threat nuclear and chemical weapons doctrine is important, particularly during large-scale ground combat operations."[125] Contrarily, nuclear considerations are not even included as operating environmental challenges in the ADP's logic chart.[126] So while current doctrine acknowledges that the intelligence warfighting function must consider nuclear battlefield possibilities, the lack of content and only passive references demonstrates only a marginal interest in such analysis at the tactical and operational levels.

Intelligence doctrine is remarkably similar between the current and the historical. The lack of depth in either likely aids the comparison. Both emphasize anticipating enemy nuclear use. The historical doctrine specifically recommends conducting a nuclear-oriented terrain analysis, current doctrine includes such an analysis within the construct of its generic enemy and terrain analyses.

[124] US Army, FM 100-5 (1982), 3-2, 3-5, 3-6; US Army, FM 100-5 (1986) 76-80; US Army, FM 100-15 (1989), 3-17; US Army, FM 61-100 (1962), 230.

[125] US Army, ADP 2-0, 1-5.

[126] US Army, ADP 2-0, viii.

Sustainment Warfighting Function

Sustainment	Historical Doctrine											Current Doctrine		
	FM 100-5						FM 100-15			FM 61/71-100		ADP 4-0	FM 4-0	FM 3-94
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2019	2019	2014
Enhanced Dispersion	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Redundancy		Yes	Yes		Yes	Yes			Yes			Yes	Yes	
Medically Overwhelmed		Yes	Yes	Yes	Yes	Yes							Yes	
Separate the Contaminated					Yes					Yes		Yes	Yes	

Table 10. Results for Sustainment Warfighting Function. *Source*: Created by author.

Unlike the previous warfighting functions, there is a significant degree of continuity from the Cold War to current doctrine within the sustainment WfF. Three themes emerged from the Cold War doctrine, primarily from FM 100-5 *Operations*, with a fourth theme relevant to a nuclear battlefield emanating from current doctrine.

In line with many of the previous warfighting functions, enhanced dispersion on a nuclear battlefield is the first sustainment theme. This theme has the most manuals commenting, with twelve of fourteen discussing the topic and all of them promoting an increased need for sustainment dispersion.[127] All the versions within the FM 100-5 series mention the need to avoid "undue massing of forces and materiel" and prevent "massive concentrations of forces and supplies," because such massing presents lucrative targets that are within the reach of enemy nuclear weapons.[128] Unlike the vast majority of other themes across all the previous WfFs, all current manuals concur with the historical consensus for enhanced dispersion based on the enemy's abilities.[129]

[127] US Army, FM 100-5 (1954), 59, 194; US Army, FM 100-5 (1962), 117, 165, 173, 174; US Army, FM 100-5 (1968), 6-21, 9-6; US Army, FM 100-5 (1976), 10-5; US Army, FM 100-5 (1982), 1-3, 4-4; US Army, FM 100-5 (1986), 39, 87, 149; FM 100-15 (1963), 38; US Army, FM 100-15 (1989), D-1; US Army, FM 71-100 (1990), 1-12; US Army, ADP 4-0, 1-2, 1-4; US Army, FM 4-0, 5-26; US Army, FM 3-94, 7-7.

[128] US Army, FM 100-5 (1954), 194; US Army, FM 100-5 (1962), 117, 173, 174; US Army, FM 100-5 (1968), 6-21; US Army, FM 100-5 (1982), 1-3.

[129] US Army, ADP 4-0, 1-2, 1-4; US Army, FM 4-0, 5-26; US Army, FM 3-94, 7-7.

The second theme is redundancy. While the need for redundancy within sustainment systems and functions has less commentary, there is still unanimity across all seven manuals that comment on it, including two current manuals.[130] However, there is a mild time consideration. The earliest versions of FM 100-5 and FM 100-15 *Larger Units: Theater Army-Corps* do not discuss redundancy in any battlefield environments, and thereby do not endorse the topic.[131] The endorsement of more redundancy later in the Cold War, likely a result of greater lethality and range of nuclear weapons, is continued in current sustainment doctrine. While a nuclear battlefield is not specifically mentioned in current doctrine, the sustainment principles of responsiveness, survivability, and continuity and redundancy are all applicable when operating on a nuclear battlefield.[132]

The third theme present is having medical systems overwhelmed on a nuclear battlefield. While it may seem commonsense that a nuclear battlefield would produce high numbers of casualties, the importance is based on a casualty to time ratio. As FM 100-5's 1976 version stated, "the total losses may not go higher than in extended periods of severe fighting on the lethal conventional battlefield, but they would occur in a shorter time. There could be severe shortages of critical supplies and medical treatment, placing a severe strain on logistical support systems."[133] However, only two sets of manuals, FM 100-5 *Operations* and FM 4-0 *Sustainment Operations* discuss how a nuclear battlefield would overwhelm tactical and operational medical systems, with all six of the individual manuals admitting such overwhelmingly likely to occur.[134]

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[130] US Army, FM 100-5 (1962), 165; US Army, FM 100-5 (1968), 4-15; US Army, FM 100-5 (1982), 4-4; US Army, FM 100-5 (1986), 87, 149; US Army, FM 100-15 (1989), 3-19, 4-6; US Army, FM 71-100 (1990), 1-12; US Army, ADP 4-0, 1-2, 1-4; US Army, FM 4-0, 3-20.

[131] US Army, FM 100-5 (1954); US Army, FM 100-15 (1950); US Army, FM 100-15 (1963).

[132] US Army, ADP 4-0, 1-2, 1-4; US Army, FM 4-0, 3-20.

[133] US Army, FM 100-5 (1976), 10-5.

[134] US Army, FM 100-5 (1962), 59-61, 171, 172; US Army, FM 100-5 (1968), 6-3; US Army, FM 100-5 (1976), 10-5; US Army, FM 100-5 (1982), 4-1; US Army, FM 100-5 (1986), 46, 86, 87; US Army, FM 4-0, 6-8.

The final theme discussed separating nuclear contaminated casualties from non-contaminated one. Only two of the eleven historical manuals discuss the topic.[135] While both support separating casualties based on contamination, the facts that the manuals are not within the same series and are separated by twenty years do not support any historical conclusion.[136] Contrarily, both of the sustainment specific capstone manuals discuss the topic at length, and they demand that units treat contaminated casualties separately from non-contaminated casualties.[137]

There is one caveat to an analysis of current sustainment doctrine concerning a nuclear battlefield. The references within ADP 4-0 *Sustainment* and FM 4-0 *Sustainment Operations* are more often to chemical, biological, radiological, and nuclear (CBRN) threats and weapons of mass destruction than to purely nuclear weapons.[138] It is therefore difficult to discern if such references demonstrate anticipation of a nuclear battlefield or are more focused on chemical, biological, and radiological threats. However, preparation for one CBRN threat, or at least the process to prepare, can translate to preparation for a nuclear battlefield.

The historical consensus for sustainment revolves around how to not make nodes lucrative targets for nuclear attack. Dispersion and redundancy, especially medical redundancy, are the proposed solutions. Medically, there is a theme of anticipating mass casualties in a shorter amount of time than a nonnuclear battlefield would produce. Current doctrine echoes much of the historical consensus, namely, reducing the profitability of a nuclear strike through dispersion and redundancy and preparing for causalities. Current doctrine, however, is more developed regarding how to deal with different types of casualties stemming from a nuclear battlefield. In this regard, current doctrine makes its first display of being more prepared for a nuclear battlefield than historical doctrine.

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[135] US Army, FM 100-5 (1982), 9-3; US Army, FM 61-100 (1962), 42, 63.

[136] US Army, FM 100-5 (1982), 9-3; US Army, FM 61-100 (1962), 42, 63.

[137] US Army, ADP 4-0, 1-2, 1-18, 1-19, 2-16; US Army, FM 4-0, 1-2, A-22, A-23.

[138] US Army, ADP 4-0; US Army, FM 4-0.

Command and Control Warfighting Function

Command and Control	Historical Doctrine											Current Doctrine			
	FM 100-5						FM 100-15			FM 61/71-100		ADP 6-0	FM 6-0	FM 6-02	FM 3-94
	1954	1962	1968	1976	1982	1986	1950	1963	1989	1962	1990	2019	2016	2019	2014
Prepare to Operate With Degraded C2	Yes	Yes	Yes	Yes	Yes	Yes			Yes			Yes	Yes	Yes	
Emphasize Redundancy	Yes				Yes	Yes		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Centralize vs Decentralize		Decentrlze nonnuke forces	Decentrlze nonnuke forces	Decentrlze nonnuke forces	Decentrlze nonnuke forces	Decentrlze nonnuke forces	Centralize artillery and theater level		Decentrlze nonnuke forces	Centralize Nuclear	Centralize Nuclear	Mission Command	Mission Command	Mission Command	Mission Command
Human Element Important			Yes	Yes	Yes	Yes					Yes		Yes		

Table 11. Results for Command and Control Warfighting Function. *Source*: Created by author.

Command and control is the final warfighting function and one of the least conclusive. There is remarkably little coherence across the warfighting function throughout the Cold War, with the warfighting function itself fluctuating throughout the period in terms of definition and scope. Current doctrine is far more coherent and provided the genesis for three of the four themes: the likelihood to operate with degraded command and control systems; emphasis on signals redundancy; and a discussion on centralized vice decentralized control of subordinate units. The final theme, the importance of the human aspect of warfare, derived primarily from FM 100-5 *Operations*.

Preparing for degraded command and control systems may seem natural on the modern technologically saturated battlefield, but only FM 100-5 offers a Cold War consensus on the topic. Of the fifteen versions of Cold War and current manuals within the command and control WfF, ten specifically mention the need to prepare for degraded communications on any type of battlefield.[139] Of the historical doctrine, all six versions of FM 100-5 recommend preparing for degraded communications, while only one version of FM 100-15 *Larger Units* / *Corps* and FM

[139] US Army, FM 100-5 (1954), 8, 34, 35; US Army, FM 100-5 (1962), 21; US Army, FM 100-5 (1968), 3-2; US Army, FM 100-5 (1976), 10-5; US Army, FM 100-5 (1982), 4-1, 4-2, 7-2; US Army, FM 100-5 (1986), 52, 86; US Army, FM 100-15 (1989), 4-1, 4-5; US Army, ADP 6-0, 4-15; US Army, FM 6-0, 1-9; US Army, FM 6-02, 1-5 to 1-7, 3-3.

61-100 / 71-100 *Division* does so. That version merely addresses the need for agility and initiative within communications systems.[140] Current doctrine supports preparing for degraded communications enthusiastically. ADP 6-0 *Mission Command: Command and Control of Army Forces*, FM 6-0 *Commander and Staff Organization and Operations*, and FM 6-02 *Signal Support to Operations* all accept that battlefield effects will degrade communications systems.[141] ADP 6-0 specifically names nuclear use as a cause of degraded communications, while FM 6-0 lists "react to a degraded network" as a specific command post battle drill.[142]

Forecasting for a degraded network should lead to planning for signal redundancy. Overall, eleven of the fifteen manuals address signals redundancy, and ten of the eleven emphasize it.[143] Current doctrine unambiguously supports redundancy on the battlefield, with all four manuals concurring.[144] All three historical manuals address the topic, with all but the 1963 FM 100-15 version supporting signal redundancy.[145] That version does not support units establishing their own redundant signal capacity, but instead recommends that higher units, should they lose the effectiveness of their systems, simply use their subordinate units' systems.[146] With this exception aside, the historical consensus is actually strong. Clearly by the end of the Cold War, the manuals for all echelons at the division level and higher support redundant signals within a formation.

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[140] US Army, FM 100-15 (1989), 4-1, 4-5.

[141] US Army, ADP 6-0, 4-15; US Army, FM 6-0, 1-9; US Army, FM 6-02, 1-5 to 1-7, 3-3.

[142] US Army, ADP 6-0, 4-15; US Army, FM 6-0, 1-9.

[143] US Army, FM 100-5 (1954), 33, 34; US Army, FM 100-5 (1982), 14-3; US Army, FM 100-5 (1986), 39; US Army, FM 100-15 (1963), 45; US Army, FM 100-15 (1989), 4-5, 4-6; US Army, FM 61-100 (1962), 26; US Army, FM 71-100 (1990), 3-3; US Army, ADP 6-0, 4-12; US Army, FM 6-0, 1-4; US Army, FM 6-02, 1-4, 1-5, 1-7, 1-8, A-7 to A-9; US Army, FM 3-94, 4-14.

[144] US Army, ADP 6-0, 4-12; US Army, FM 6-0, 1-4; US Army, FM 6-02, 1-4, 1-5, 1-7, 1-8, A-7 to A-9; US Army, FM 3-94, 4-14.

[145] US Army, FM 100-5 (1954), 33, 34; US Army, FM 100-5 (1982), 14-3; US Army, FM 100-5 (1986), 39; US Army, FM 100-15 (1963), 45; US Army, FM 100-15 (1989), 4-5, 4-6; US Army, FM 61-100 (1962), 26; US Army, FM 71-100 (1990), 3-3.

[146] US Army, FM 100-15 (1963), 45.

Whether control should be centralized or decentralized, doctrine offers no firm consensus. Of the fifteen manuals examined, thirteen comment on centralization of control but provide four different recommendations.[147] All five versions of the FM 100-5 series comment on the theme, explicitly recommending a decentralized command structure for nonnuclear forces.[148] Since 1962, the series accounts for the need for rapid decision-making in a nuclear environment in which communication is difficult. Therefore, that year's version includes an entire paragraph on when bypassing parts of the chain of command are authorized, namely when time and speed are essential and communication to one headquarters is lost.[149] The 1968 version expands upon the previous idea with the need for trust in a nuclear environment, saying, "the commander must place greater reliance on the initiative, integrity, courage, and professional ability of his subordinate commanders."[150] The 1989 version of FM 100-15 concurs with this recommendation.[151] However, the rest of the FM 100-15 series does not. The 1963 version does not address the theme enough to draw a conclusion, and the 1950 version recommends to only centralize artillery, including nuclear artillery, and theater level functions.[152] The *Division* series offers a third historical recommendation to centralize nuclear forces, based mainly on the better employment of nuclear effects by commanders with a better understanding of the larger battlefield.[153] While centralizing nuclear forces and decentralizing nonnuclear forces may appear

[147] US Army, FM 100-5 (1954), 118; US Army, FM 100-5 (1962), 21, 36, 59-61, 166; US Army, FM 100-5 (1968), 3-2, 6-3; US Army, FM 100-5 (1976), 3-2, 14-15; US Army, FM 100-5 (1982), 2-7, 9-5; US Army, FM 100-5 (1986), 163; US Army, FM 100-15 (1950), 14, 54, 64; US Army, FM 100-15 (1989), 4-0 to 4-3; US Army, FM 61-100 (1962), 33; US Army, FM 71-100 (1990), E-1, E-4, E-6; US Army, ADP 6-0, 4-15; US Army, FM 6-0, 3-1, 9-13; US Army, FM 6-02, 1-7, 1-14, 2-32; US Army, FM 3-94, 5-9, 5-14, 5-17, 5-19, 5-24, 6-15.

[148] US Army, FM 100-5 (1954), 118; US Army, FM 100-5 (1962), 21, 36, 59-61, 166; US Army, FM 100-5 (1968), 3-2, 6-3; US Army, FM 100-5 (1976), 3-2, 14-15; US Army, FM 100-5 (1982), 2-7, 9-5; US Army, FM 100-5 (1986), 163.

[149] US Army, FM 100-5 (1962), 21.

[150] US Army, FM 100-5 (1968), 6-3.

[151] US Army, FM 100-15 (1989), 4-0 to 4-3.

[152] US Army, FM 100-15 (1950), 14, 54, 64; US Army, FM 100-15 (1989), 4-0 to 4-3.

[153] US Army, FM 61-100 (1962), 33; US Army, FM 71-100 (1990), E-1, E-4, E-6.

synonymous they are not. The recommendations focus on different aspects of an engagement, namely one on nuclear forces and one on conventional. Therefore centralized or decentralized conventional forces could pair equally well with centralized nuclear forces, per FM 61-100 / 71-100, and the same logic applies to nuclear forces when using FM 100-5's doctrine. Finally, current doctrine recommends a fourth path, mission command. All four of the current manuals recommend mission command as the answer to centralize or decentralize.[154] Mission command is defined in ADP 6-0 as, "The Army's approach to command and control that empowers subordinate decision making and decentralized execution appropriate to the situation."[155] The phrase "decentralized execution" paired with the fact that the Army currently is a nonnuclear force lends to a similar comparison to the FM 100-5 series. As FM 100-5 *Operations* was the capstone manual during its time, similar to the ADP doctrinal family, there is a likelihood that the mission command philosophy derived from such a decentralization of nonnuclear forces approach.

The final theme of the importance of the human element in combat is the least convincing. Human element here refers to the internal machinations of soldiers on the battlefield, particular from a macro perspective. Thus the human element in this regard does not entail individual leader characteristics or actions, which have been a part of warfare since the beginning of time. But that "man remains the most essential element on the battlefield," even on a nuclear battlefield.[156] Only six manuals address the topic in enough detail to draw a conclusion, with all six of them affirming the importance. Specific to nuclear battlefields, FM 100-5's 1976 version is the first to mention the increased stress upon soldiers needing to wear protective equipment.[157]

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[154] US Army, ADP 6-0, 4-15; US Army, FM 6-0, 3-1, 9-13; US Army, FM 6-02, 1-7, 1-14, 2-32; US Army, FM 3-94, 5-9, 5-14, 5-17, 5-19, 5-24, 6-15.

[155] US Army, ADP 6-0, Glossary-3.

[156] US Army, FM 100-5 (1968), 3-1.

[157] US Army, FM 100-5 (1976), 11-6.

The two 1980s versions of FM 100-5 also mention the human factor's role in command and control in a nuclear environment. Recognizing a distinct difference between nuclear and nonnuclear environments, the versions explain that the burdens of wearing protective equipment could cause "inexperienced or poorly trained small-unit leaders [to] become so concerned about their own welfare that they cease to function as leaders. *Only cohesive, disciplined, and well-trained units can function in such an environment* (original emphasis)."[158] The 1986 version adds a comment about battlefield stress, "The threat or use of nuclear and chemical weapons are all mentally corrosive, and commanders must act to protect their units accordingly. Leaders at all levels must be able to recognize the signs of battlefield stress and deal with it quickly and effectively."[159] This increased stress in the already stressful environment of combat reduces productivity from soldiers, which significantly differentiates nuclear from nonnuclear battlefields.

The historical and current consensuses align concerning the linked themes of degraded networks and redundancy. The consensus of current doctrine concerning the degree of command centralization is unanimous upon mission command. Mission command does not directly relate to any of the command centralization proposals within historical doctrine, making a comparison between historical and current doctrine on this theme difficult. There is some consensus across time concerning the human element, but the sample size is small enough to make any conclusions questionable.

Recommendations and Conclusion

The difference between Cold War doctrine and current doctrine is glaring. They are essentially opposites when it comes to nuclear assumptions. The latter dismisses a nuclear battlefield as a fringe possibility, while the former accepts it as likely. Accordingly, Cold War doctrine goes into significant depth analyzing the characteristics of a nuclear battlefield,

[158] US Army, FM 100-5 (1982), 4-2; US Army, FM 100-5 (1986), 86.

[159] US Army, FM 100-5 (1986), 88.

particularly contrasting it with a nonnuclear battlefield, and anticipating both enemy and friendly use. Support for friendly use of nuclear weapons wanes as the Cold War drags on into the 1970s and 1980s, with the likelihood of employment decreasing significantly. However, even the later manuals at least prepare for friendly use, choosing to prepare for a low likelihood event instead of simply dismissing it, as current doctrine does. Since the characteristics of a nuclear battlefield are at times antithetical to those of a nonnuclear battlefield (e.g., dispersion, massing effects, mobility, redundancy, centralization), current doctrine would be significantly improved by discussing nuclear battlefields. Particularly when preparing to face nuclear powers in the near future, the Army should even consider revising its battlefield assumptions and anticipate a nuclear battlefield.

The tension, even contradiction at times, between nuclear and nonnuclear environments is stark across all the warfighting functions. Within maneuver, the tension is primarily related to spatial dispersion. Nonnuclear environments favor dense formations and support massing well prior to attacks. However, in a nuclear environment, speed is favored as a way to facilitate dispersion for as long as possible prior to an attack. While the favorability of armor and mechanized units is common in both environments, the need for them is more acute on a nuclear battlefield because of their enhanced firepower, speed, and survivability.

The fires warfighting function is perhaps the most constant in relation to operating environment. A wider distribution and mobility are certainly preferred in a nuclear environment for the same survivability reason as within the maneuver warfighting function, but there is relatively little change. Offensive fires treat a nuclear capability as essentially the same as conventional munitions, though later in the Cold War the authorities for releasing such munitions are moved to higher echelons. Defensively, the application of nuclear fires is likewise viewed as essentially the same as conventional fires, except with a decrease in the number of delivery platforms for a similar effect. Like maneuver, a nuclear environment impacts fires primarily within a survivability paradigm.

Survivability is the most important component of the protection warfighting function when considering a nuclear battlefield. The aspects of protection are not different between nuclear and nonnuclear environments; both rely upon active and passive measures, such as dispersion, hardening, and air defense. However, the geographic scope for a nuclear environment is far larger than in a nonnuclear environment.

The intelligence warfighting function changes little concerning a nuclear or nonnuclear battlefield. The priority and level of importance of nuclear-related assets and activities unsurprisingly increases in a potential nuclear environment, with less concern for routing such information through normal intelligence channels. However, intelligence tasks remain virtually the same between the environments.

Sustainment activities are significantly impacted by the change in environments from nonnuclear to nuclear. The sustainment warfighting function is constantly trying to be both effective and efficient, which the two characteristics frequently being at odds. A nuclear environment swings the effort firmly towards effectiveness. Efficiency is generally created by streamlining systems, such as consolidating depots, maximizing specific routes, and eliminating unnecessary redundancy. Within a nuclear environment, redundancy is key. As sustainment, particularly logistics, nodes are typically relatively fixed sites, they create lucrative targets for a nuclear enemy. To reduce the negative impact of any single site's destruction, sustainers build significant redundancy within their system. While this redundancy increases the survivability of the sustainment system, it reduces the speed and responsiveness of the entire system. This reduction can reduce the operational reach of combat units and the tempo of operations.

The command and control warfighting function suffers from much of the same issues as sustainment, particularly the need to increase redundancy. Communication nodes are best utilized as larger and static nodes within a nonnuclear environment, since the threat to them within the rear areas is less and the ability to protect such consolidated sites from nonnuclear enemy attacks is enhanced. However, a nuclear environment inverses that relationship, where a host of smaller

nodes is recommended to ensure that in the event of a nuclear attack at least some of the communication infrastructure will survive. Concerning the level of control on a nuclear battlefield, the likelihood of complete loss of communications is far higher. This likelihood means commanders must accept a more decentralized form of command, with reliance on intent and endstate far more than in a nonnuclear environment characterized by standardized reporting.

The comparison of current and nonnuclear doctrine is not entirely fair. There were significant historical and doctrinal changes that occurred within the US Army from 1950 to 1990. Many of the doctrinal changes likely reflect global and domestic non-military changes as much as military adjustments. Because, the United States had primarily one enemy during the Cold War, the Soviet Union, American historical nuclear doctrine most likely reflects the American interpretation of the Soviet doctrine more than any generalized nuclear theory of war. Analyzing the impacts of these potential influencers is beyond the scope of this monograph. Yet there are three practical and applicable recommendations.

First, each major current manual should include a nuclear environment specific appendix. This appendix should address the differences in the operating environment and how those differences impact the manual's subject. Based on the function(s) discussed within the manual, fundamental principles may change. As previously discussed, ADP 2-0 *Intelligence* would likely see little change to its activities within the nuclear environment, while ADP 4-0 *Sustainment* would likely see radical changes regarding distances between nodes, the type of units attached to maneuver forces, and the degree of risk accepted. This appendix would pertain not just to actual nuclear environments, but to situations where the likelihood of shifting to a nuclear environment is credible. Adding an appendix only, as opposed to revamping entire manuals, is also a good compromise between too much and too little doctrinal change. Too much change can reduce efficiency and coherence, while too little change risks failure to optimize for war.[160]

[160] Andrew A. Gallo, "Understanding Military Doctrinal Change During Peacetime" (doctoral thesis, Columbia University, 2018), 8.

Second, major corps and division operations should include a standardized decision point regarding switching to a nuclear environment paradigm. With significant changes necessary when shifting from nonnuclear to nuclear environments, that shift should be a commander's prerogative. Since the major adversaries to the United States are nuclear powers, routinizing such a decision point is prudent. Including such a decision point entails planning, at least conceptually, a nuclear sequel, complete with risk assessment and shifted priorities.

Third, to validate the aforementioned recommendations, units must train to fight in nuclear environments. Not only would training improve readiness, but since there are no historical battlefields to reference such training can serve as laboratories to test nuclear-related concepts. Training should include not only live training, such as one combat training center battle period per rotation, but also command post exercises, such as warfighter exercises.

As the Army tries to forecast the future and prepare for the unknown, there is a value in looking to the past for help. A future marked by nuclear battlefields is unlikely, but the impact from such an event is high. During the Cold War, the Army anticipated a nuclear battlefield and developed tactics to apply on either a nuclear or nonnuclear one. Today's environment is remarkably similar, but the Army no longer has a nuclear battlefield doctrine. Examining Cold War-era doctrine can help the Army develop a new doctrine that better prepares the Army for a possible nuclear battlefield.

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