Technology's Impact on the Operational Level of War

A Monograph
By
Major Edward V. Rowe
United States Army

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

Second Term AY 99-00

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Major Edward V. Rowe

Title of Monograph: Technology's Impact on the Operational Level of War

Approved by:

_____ Monograph Director
LTC George A. Latham, MMAS

_____ Director, School of Advanced
COL Robin P. Swan, MMAS Military Studies

_____ Director, Graduate Degree
Philip J. Brookes, Ph.D. Program

Accepted this 26th Day of April 2000

ABSTRACT

TECHNOLOGY'S IMPACT ON THE OPERATIONAL LEVEL OF WAR by MAJ Edward Rowe, 43 Pages.

Since the dawn of the age of science, man has attempted to find in technology simple solutions to the difficult problems of warfare. Modern developments in information technology continue this history, offering to provide ways to simplify some complexities of modern warfare. Information technology, however, differs from previous technological developments in that it represents both the means to improve weapon systems and the means with which to improve command and control.

This monograph pursues the question of the operational level of war's relevance in the future. The future environment promises to be one where tactical commanders possess weapons of operational or strategic range and strategic commanders can command tactical forces. Technologically speaking, one can see in this future environment the potential to eliminate the operational level of war.

To account for factors outside the strictly technological realm, this monograph uses three domains of warfare to examine the operational level's continued relevance. The three domains: the physical, the cybernetic, and the moral provide historical insights into how the operational level of war relates to its greater environment. These three domains also provide a reasonable basis from which to compare the future to the past and present.

Three views of the operational level of war's origins provide further insight into the philosophical and theoretical reasons for its existence. These reasons yield the criteria of demographics, geopolitical factors, and technology as contributors to the origins of the operational level of war. Projecting future information technologies across the three domains of warfare enables one to assess whether these criteria, and hence the operational level of war remain relevant.

This study concludes that the operational level of war remains relevant in the near future. The ability of information technology to dominate the physical and cybernetic domains seems possible. Yet within the moral domain of warfare alone one finds sufficient reasons to declare the operational level of war relevant.

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CHAPTER ONE

INTRODUCTION

United States military operations since Operation Desert Storm represent a fundamentally new form of warfare. This type of warfare, enabled by information technology, allows commanders at higher levels to command and control tactical forces. Taken to a logical extreme, these developments suggest a return to warfare in which one strategic commander can command tactical forces involved in a battle or campaign.

This paper pursues the premise that technology may return this type of warfare. From the perspective of the levels of war, this change threatens the autonomy and relevance of the operational level of war. Commanders at operational level develop campaigns and major operations to achieve strategic objectives.[1]

Given United States Army doctrine specifying the use of strategic, operational, and tactical levels in organizing military operations,[2] this paper examines the theoretical relevance of the operational level of war in the near future. This paper investigates those issues created by the strategic leader's increasing ability to execute tactical command and the concurrent increases in the tactical commander's reach. This monograph investigates whether the United States National Command Authority can command and control tactical operations worldwide to achieve strategic objectives.

This examination proceeds from a framework consisting of two underlying premises. The first premise accepts that the operational level of war as it

currently exists is purposeful. This premise enables comparison of an expected future to current doctrinal concepts. The second premise accepts that three domains exist within the military environment: the physical, the moral, and the cybernetic.[3] These environmental realms allow the means to compare doctrinal concepts within a historical frame of reference.

The framework that these two premises constitute also allows identification of an intuitive threshold of the operational level of war's relevance. Below this threshold, the operational level of war no longer aids in achieving military objectives within the three domains of the military environment. Above this threshold, the operational level retains its relevance. The threshold itself, the paper contends, remains as significant as it is abstract and immeasurable.

To compare these domains in the past, present, and future, this study employs three criteria. These criteria come from the works of military theorist Dr. James J. Schneider and consist of demographic, geopolitical, and technological developments.[4] Schneider identifies these developments as contributors to the development of the operational level of war in his work *The Theory of the Operational Art*.[5]

The first of these criteria, demographic developments, refers simply to the evolving development of nations and their populations. This criterion assumes the existence of nation-states defined for our purposes here as an internationally recognized entity possessing some capability to field its own military forces. Schneider believes that the "dramatic rise in population throughout much of the

world during the nineteenth century led to the ability of large nations to deploy not just one but several field armies."[6]

The complexity created by this development prevented strategic leaders from being able to command and control tactical forces because demographic developments created forces large enough to exceed the ability of one commander to control. Demographic developments correspondingly led to greater physical separation of independent enemy forces which in turn led to too distant a separation of friendly forces for one commander to control. According to Schneider, each of these enemy forces possessed the ability to campaign on its own.[7] Such a development required that the commander now opposing such a nation-state had to conduct distributed operations and campaigns himself, and these developments represented the operational level of war.[8] This commander possessed no other alternative at the time because the types of command and control systems that could enable his control of these dispersed tactical operations simply did not exist.

The second criteria employed here, geopolitical developments, refers to the system of alliance and security arrangements that nations agreed to over time for mutual defense.[9] Those systems, according to Schneider, also led to the development of the operational level because they, like demographics, enabled the fielding of multiple armies.[10] This development also contributed to the requirement for distributed operations and campaigns representative of the operational level of war.

The third criterion, technology, represents both a source of the operational level of war and the threat to that level studied here. Technology, according to Schneider, contributed to the development of the operational level of war by creating unbearable conditions for massed formations.[11] These unbearable conditions caused by industrial age weapons and other technological developments led to greater dispersal of forces. This dispersal then contributed to the development of operational concepts for the same reasons stated.

This monograph presents a progressive argument to achieve comparison of these criteria to the past, present, and future relevance of the operational level of war. The next chapter of this monograph examines technology, its military uses, and how it may suggest the potential irrelevance of the operational level of war. The following chapter then examines some theoretical and historical assessments of how and why the operational level of war came into being. These two chapters highlight some trends that also indicate the potential threat to the operational level of war's relevance. In turn, these considerations allow chapter four to present an assessment of how information technology currently affects the operational level of war through the three domains of war.

This study concludes that the operational level of war remains relevant in the future. The study contends that the criteria of demographics, geopolitical factors, and technology not only demanded the origination of an operational level, but that they also suggest the inherent wisdom of its continued use. The evidence indicates that in achieving its greatest potential, technology may approach the domination of the physical and cybernetic domains of war. The

paper concludes, however, that technology can never dominate the moral domain of warfare. This latter observation alone represents a compelling reason for the United States Army to retain the operational level of war even as it exploits information technology at all levels of war to its advantage.

The paper identifies some trends that service component leaders and their staffs might consider in fulfilling their obligation to organize, train, and equip forces for the combatant commander. The study does so by identifying potential future roles of tactical, operational, and strategic leaders in a military environment permeated by information technology. As such this study may interest force developers at all levels of warfare while provoking thoughtful debate among any students of the operational art and level of war.

CHAPTER TWO

TECHNOLOGY

The Oxford Dictionary of Current English defines technology as "the knowledge or use of the mechanical arts and the applied sciences."[12] This definition evokes images of scientifically minded organizations developing technological solutions to perceived needs. That image reflects accurately the current experience of the United States Army and its sister services.

History indicates that technology's military usefulness results from the military's ability from the age of science onward to develop technology for specific and pre-conceived applications.[13] Whereas man to a large extent merely *utilized* tools as weapons for warfare before the age of science, afterwards he could systematically develop weapons and equipment for *use* on the field of battle. This development, besides merging scientists and soldiers into common efforts, contributed to the evolution of modern warfare and correspondingly to the development of the operational level of war.

After the advent of the age of science, technology became a key component of evolving military developments. Military theorist Martin Van Creveld claimed this much in his book *Technology and War* claiming that "war is completely permeated by technology and governed by it."[14] Schneider likewise supported Van Creveld's thesis by citing numerous examples of technological developments contributing to the creation of the operational level of war such as the minie ball, the breechloading mechanism, and the magazine.[15]

Recent information technology developments seem to reinforce Van Creveld's premise. Military operations conducted by the US throughout the 1990s provide vivid examples of precision weapons and instantaneous reporting of battlefield scenes from around the world. These developments, like their predecessors, represent continued changes in the way militaries fight.

Yet information technologies differ from previous technologies in at least one significant aspect. That difference results from information technology's ability to contribute simultaneously to the effectiveness of both command and control systems and tactical weapons. Previous technological developments seldom affected both the physical and cybernetic realms simultaneously and never with such significant implications. One needs merely to watch international news footage aired live of precision munitions impacting targets halfway across the world to observe this dramatic change.

These developments raise the issue of how thorough their impacts can affect how the United States fights its wars. One way it might comes from the potential for national leaders to question the relevance of the operational level of war. Given the increased strategic and tactical capabilities described, these developments seem at least to threaten the operational level of war's relevance even if they do not make that level completely irrelevant.

David Jablonsky, a professor at the US Army War College, observed that capability increases associated with the military employment of information technologies at the tactical and strategic levels came at the cost of the operational commander's autonomy.[16] Jablonsky depicted this change using a Venn Diagram showing three interlocked rings. Jablonsky contends, using this technique, that as information technology has evolved, the strategic and tactical rings moved ever closer.[17] Each expansion of the tactical or strategic ring, according to Jablonsky's interpretation, necessarily caused further encroachment

upon that ring belonging to the operational level commander. The logical end of this development presented the threat to the operational level of war's relevance studied here.

Before investigating either the nature of the operational level or estimating the probable impacts of this sort of encroachment, however, a more specific understanding of the nature of the expansion of the strategic and tactical levels is needed. This understanding establishes a foundation upon which to assess the possible impacts of strategic and tactical capabilities in the future upon the operational level of war. To achieve this understanding one can first observe those information technologies enabling the expansion of the strategic commander's capability and his potential ability to command tactical operations. After these observations one can then compare those changes in the tactical commander's abilities and asses his potential to effect strategic objectives.

The strategic level represents that level at which the leader establishes the national security objectives. Fundamentally the decision the strategic commander faces is when, where, and how to employ the diplomatic, informational, military, and economic (DIME) sources of national power. This leader, represented in the United States for our purposes by the National Command Authority (NCA), bases these decisions upon the national security strategy.[18] These documents combine with evolving current events and crises to cue strategic decisions.

Fundamentally the NCA requires three abilities to accomplish this purpose. First the NCA must posses the ability to detect the cues that inform

themselves that they should make a decision. Secondly the NCA must posses the ability to make that decision using some problem solving process designed to direct the DIME towards the desired end. Finally the NCA must posses the ability to act employing the DIME towards that desired end as the NCA best sees fit.

In each of these three abilities information technology enables the expansion of the strategic leader's capability. First information technology enables improved detection and reporting of those cues sought by the strategic leaders. Evidence to support this claim exists in such examples as the evolution and exploitation of space-based reconnaissance and surveillance and the ability of collectors to send digital images worldwide instantaneously over the Internet. Secondly, information technology enhances the NCA's ability to conduct decision-making as it does at all levels of war by automating many of this stage's processes. Finally information technology improves the ability of the NCA to act by providing greater control in employing the DIME.

This last capacity provides the focal point for this aspect of the discussion. Essentially this point begs the question of whether or not the strategic leader can command and control the employment of these sources of power, especially those of the military in order to achieve national objectives. The single technological feasibility test that answers this question remains as elusive as the unified theorem of physics. In current events and expected developments, however, one sees the possibility for such an end.

In the international news media one sees the ability today to present worldwide events instantaneously. This accomplishment requires of the media

that they possess a reporter, the technical means to communicate the message, and an audience. Such an example provides a useful analogy for the increasing potential of strategic leaders to observe tactical events.

United States national strategic level leaders possess in the Global Command and Control System (GCCS) the means to communicate messages from their tactical commanders through the common operating environment of each command and control system.[19] Assuming that sufficient media exists to pass messages from the strategic leader to the tactical leader, then nothing technological stands in the way of the NCA commanding and controlling the tactical operation. From this singular view military chains of command above the tactical level provide what Clausewitz might call "friction" to the smooth execution of military operations.[20]

This statement reflects a simplistic view of the strategic and tactical leaders' worlds. This world is one in which the operational commander represents bureaucracy. Once recognized as no longer efficient in terms of cost-benefit assessments, such a bureaucracy would soon find itself set aside as a relic of the past analogous to the coastal artillery. At best the operational level commander in this world would simply monitor communications between senior and subordinate and ensure the proper coordination occurs to effect the desired end.

Before viewing this world from other than this inductive view, one must also see what this view allows of the tactical world. At the tactical level commanders today possess weapons of greater range and precision than ever

before. Tactical commanders today control such weapons as the AH-64 Apache attack helicopter, the Army Tactical Attack Missile (ATACMS) and even Tactical Land Attack Missiles (TLAMS). These weapons, which can attack with precision targets at ranges exceeding hundreds of kilometers, give commanders ranges that a World War II era commander would think of as operational or strategic in nature. One finds a parallel phenomenon in the evolution of the US Air Force.

The development of the military aircraft led to vehement debates as to the role of such aircraft in warfare.[21] The analogous issue from that time resulted from the fact that an aircraft by itself represented a tactical force. Once airborne, the aircraft depended could support tactical forces as close air support, conduct reconnaissance, attack targets for the operational commander, or strategically bomb industries or other targets deep in the rear.

Today's tactical Army commander, not unlike his airborne predecessor, possesses forces capable of similar effects. The increased ranges he can potentially control physically overlap the operational level commander's geographical area of control. This effect, noted by Professor Jablonsky, creates a trend that suggests the potential for centralized control of tactical forces by strategic leaders. This effect calls the operational level of war's relevance into question as the tactical commander's capabilities to control terrain and the strategic commander's ability to control the tactical commander continuously improve.

These observations suggest one potential, if not idealized military environment. The effects of what Clausewitz would call "friction" remain for

comparison of the past and present to the future physical, moral, and cybernetic domains of this environment. Before examining these sources, however, one might better understand the evolution of the operational level itself to identify how to know if it remains relevant.

CHAPTER THREE

THE OPERATIONAL LEVEL OF WAR

The US Army defines the operational level of war as "the level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations."[22] The Army's capstone doctrinal manual, *Operations*, further describes this level as the "vital link between national- and theater-strategic objectives and the tactical employment of forces on the battlefield."[23] These two descriptions establish how the Army views the operational level in terms of purpose and place.

Before evaluating the operational level of war's purpose and place in terms of past and future physical, moral, and cybernetic domains of the military environment, however, one might first understand the origins of this doctrine. One way to achieve this understanding may come from comparing and contrasting different historical and theoretical assessments of the ways and means by which the operational level of war arrived.

Dr. Robert Epstein, the professor of military history at US Army Command and General Staff College's (CGSC) School of Advanced Military Studies (SAMS) claims that modern warfare and the operational level of war originated with Napoleon as represented by his 1809 campaigns. Dr. James Schneider, the professor of military theory at that same institution disagrees with this assessment however and attributes the development of this level of war instead to General Ulysses S. Grant and his 1864 campaign plan against the Confederacy. Retired Israeli General Shimon Naveh disagrees with both of these

assessments. Naveh claims that the operational level of war does not exist until it is formally introduced into doctrine.[24] Naveh suggests that only when the former Soviet Union wrote the operational level of war into its doctrine does such a level exist.[25]

Each of these arguments possesses tremendous academic and intellectual merit. These authors present rational and compelling arguments to justify their findings. The greatest value of these arguments, however, may come from synthesizing their philosophical differences. By understanding each author's approach and justification for his claims one can gain a deeper comprehension of what the operational level of war is and how this level of war may survive the impact of information technology.

This approach accepts operational concepts as inherently abstract and theoretical in nature. Consequently such a view embraces differing assessments. By accepting each of the different assessments within their respective context, one gains the deeper understanding of the operational level of war, and can therefore assess its potential relevance in the future.

If the operational level of war possesses an abstract nature, then one must approach that level's future from such a contextual understanding. This understanding requires an understanding of the purpose served by the operational level of war over time. By approaching the operational level of war through its purpose, one can reconcile each of the various assessments of operational concepts on their own respective merits.

This paper suggests one view resulting from an interpretation of the following discussion of these various assessments. By no means does the author of this paper contend that this result represents the only logical view. Instead the author trusts the reader to find sufficient evidence to support this view. The reader, by further assessing his own views on operational concepts, can gain a firmer grasp of the operational level of war.

From the historian's viewpoint, one searching for the origins of operational concepts would seek first evidence of operational results. Having found these results, one could then rationally attribute their creator as the developer of the operational level of war. Such a process may provide insight into the school of thought that attributes creation of the operational level of war to Napoleon.

One such view comes from Dr. Epstein, who precedes this claim by establishing that "The critical change that occurred in warfare at the end of the eighteenth century was social, political, organizational, and intellectual, rather than technological."[26] While Epstein believes this change enabled Napoleon to create operational conditions, he believes the proximate cause of the operational level of war was Napoleon's ability to create "armies and operations so large that enemy armies would be unable to avoid fighting."[27] Thus, Epstein argues, did Napoleon create the operational level of war.[28]

Epstein attributes Napoleon's linking of campaigns and battles as the ultimate end of this development and representative of the operational level of war.[29] As evidence of Napoleon's creation, Epstein presents Napoleon's 1809

campaigns as representative of the changed state of warfare. Epstein supports his point well, as Napoleon clearly achieved operational results in this campaign.

Dr. James J. Schneider, the professor of military theory at SAMS provides yet another view of the operational level of war's origins. Schneider contends that General Ulysses S. Grant, in his simultaneous pursuit of the Army of Northern Virginia throughout 1864 and 1865 with two Armies following one unified aim thus created the operational level of war.[30] Schneider terms these operations and campaigns, as does Epstein term Napoleon's "distributed".[31] Yet Schneider differentiates the origins of the operational level of war beyond the organization of events in time and place.

For Schneider the key difference between the warfare of Napoleon and that of General Grant results from the latter's knowledge beforehand of the greater effects achieved in such a campaign.[32] Whereas even Epstein admits Napoleon did not recognize the operational value of his 1809 campaign before or after conducting it,[33] Schneider attributes to Grant the intentional design of his campaign to achieve such an effect.[34] Schneider transcribes an 1864 letter from Grant to Secretary of War Stanton stating as much to prove his point.[35]

For retired Israeli General Shimon Naveh, however, the idea that the operational art existed without someone using this terminology does not make much sense.[36] Naveh contends in an extremely conservative manner that the formal recognition of the advent of the operational art comes only with its doctrinal codification.[37] Naveh believes this codification to provide the only true evidence of the operational art's existence.

Among these three assessments, therefore, exist disparate views as to how, when, and why the operational level of war came about. The first view suggests that operational results provide evidence of the origins of the operational level of war. The second view derives origination from the intentional employment of distributed maneuver and campaigns. The last of the three views contends that only the doctrinal codification of such a level can support the claim that it exists.

The differences between these three appear great, yet each generally agree on what constitutes an operational concept. Each view accepts the operational level of war as a level between strategic and tactical levels. Each view also accepts that the purpose of the operational level of war is to translate strategic objectives into tactical objectives. Yet the differences of these assessments, given a common history from which to draw conclusions, raises a philosophical question.

The question raised is what does the operational level of war add to the larger picture? By identifying the purpose behind the operational level of war's development, one can predict the operational level of war's future. If Napoleon unintentionally created the operational level of war, then a future national leader may unintentionally retain operational authority not fully knowing the consequences of such an action. The premise of this argument is that the operational level of war represents a mere expediency for national leaders unable to control dispersed independent formations. As that ability to control such forces returns with information technology, this argument suggests, so too

does an operational level of war, separate and distinguishable from the strategic level become increasingly irrelevant.

Given Schneider's quotation of Grant's official report to Secretary of War Stanton, one finds Naveh's claims that the operational art did not exist in the United States until 1986 somewhat naïve. Among these three assessments, therefore, Schneider's argument seems to possess the most coherence from the theoretical viewpoint. This observation suggests that Grant's specific intent to achieve greater results through the cooperation of distributed forces best represents the origins of operational level of war.

The significance of this deduction is to enable further examination of the operational level of war's potential relevance in the future. Identifying the specific intent to garner greater results through operational level than the sum of its tactical parts identifies this level's historically consistent purpose. By evaluating this purpose of the operational level of war into the future through the physical, moral, and cybernetic domains allows a dispassionate assessment of the future relevance of the operational level of war.

CHAPTER FOUR

IMPACTS

If the three criteria of demographics, geopolitical factors, and technology provide the means to determine the operational level of war's relevance, then the physical, moral, and cybernetic domains provide the ways. In assessing the present and future implications of these criteria within these domains, the operational level of war remains relevant as long as it maintains its purpose of achieving greater results through it employment. This paper contends the operational level of war does remain relevant in the future, precisely because it will enable the achievement of greater results for strategic commanders.

Dr. Schneider's work *The Theory of Operational Art* focuses primarily on aspects within the physical domain to explain the criteria of demographics, geopolitical factors, and technology.[38] Within this domain, Schneider keys on two factors resulting from these criteria to explain the origins of the operational level of war. These factors are the rapid development of exceptionally larger armies through national conscription along with the developing system of alliances and the concurrent dispersal of tactical forces caused by weapons made more lethal through technology.[39]

Large armies and lethal weaponry still exist within the physical domain today. Alliances such as NATO demonstrate national willingness to join forces to defend security objectives beyond their borders. Weapons today clearly exceed their predecessors in lethality. This evidence suggests that the reasons the operational level of war developed still exist within the physical domain today.

The challenge to the operational level however comes at least in part from within the physical domain. Those weapons now in the control of tactical leaders exceed the wildest imagination of an operational commander such as General Grant or even General Eisenhower. These weapons possess a scale that seem to call into question the premise upon which Schneider finds the origins of the operational level of war. Can these criteria within the physical domain still justify the existence of the operational level of war?

Christopher Bellamy comments in *The Evolution of Modern Warfare* that "Generally speaking, technological advances and ingenious improvisations are seldom confined to one side and never for very long."[40] Technical specialists call what Bellamy refers to proliferation. The inference drawn from such an observation indicates that despite dramatic gains in information technology, potential enemies pursue these same technologies with the determination to possess them, defeat them, or somehow render them purposeless. Such a motivation holds tremendous currency within the moral domain as well.

The *1998 Report on the Army After Next (AAN) Project* reports that within the next twenty five years, proliferation of such technologies "will strengthen the ability of major competitors to dominate regional neighbors, threaten US partners, and endanger US forces."[41] The same report concludes that such a development increases the significance of time to future warfare, as an enemy equipped with such technology may rapidly impact operational forces and or objectives.[42] These observations create conditions that may offset advantages gained in fielding information technology.

Time's increasing criticality to commanders at all levels suggests several implications. First it suggests that the expected speed of future operations increases the relative significance of any tactical commander's ability to coordinate activities in time and space at least as much as it increases the space his senior commander might expect him to control. The second implication of warfare in the information age relates to the thesis of this paper indirectly. This implication results from the intuitive observation that such warfare may seduce senior leaders into the false belief that rapid responsiveness and increased awareness of the situation gives them the ability to micromanage such warfare.

While controversial, such an observation finds historical evidence to demonstrate this tendency and its associated peril. A prime example of this tendency exists in the experience during the Vietnam War of Secretary of Defense McNamara and his "whiz kids" statistically managing the war from the safety of the Pentagon.[43] This development, portrayed in historical references by such derogatory concepts as "body counts" and the image of target selection occurring in the White House, clearly reflects an overestimation of the ability of computers and "modern management" techniques to manage warfare.[44] While such concepts seem to translate well from the business world they originate in, their ultimate inability to assist in the domination of the physical and moral domain indicate a flaw in this premise.

The previous statement addresses a sadly ironic tendency of logical processes to render illogical solutions when dealing with the human as a discrete and predictable entity. The flawed premise embedded in such an assumption

results from the human motivation to survive and his ability to adapt to the environment in which he fights. While this concept resides within both the physical and moral domains, it may help to explain why such centralized concepts of command failed during the Vietnam War. At a minimum the idea of an adaptive enemy suggests caution to future strategic leaders in their desire to micromanage tactical forces fighting in foreign lands against a determined enemy.

Within the criteria of demographics, geopolitical factors, and technology further changes are occurring in the physical environment. The 1998 AAN Report indicates an expectation of increasing frequency of facing transnational actors and fighting in cities.[45] Both of these developments provide further evidence that indicate mitigation of an information technology enhanced force's capabilities. These examples promise to make future enemies more elusive than ever.

The physical domain seems to indicate ambiguous results for information technology's potential to dominate it. Information technology enhanced weapons and command and control systems suggest the potential for domination of the physical domain. Yet even as information technology does so, a determined enemy facing technologically enhanced systems may yet successfully adapt to and overcome such technology. Such a development would present a difficult military problem and imply a potential over reliance on technology. This over reliance would call for a balance in United States Forces, demanding they be capable of fighting with without the benefits of information technology to win battles or engagements.

The recent United States experience in Operation Allied Force in Kosovo demonstrated some of these effects. During this operation the NATO commander General Clark found several factors mitigated his ability to achieve strategic objectives through the use of primarily air attacks. Clark noted that despite his tremendous capacity to observe and attack targets virtually at will he could not always do so.[46] The nature of coalition warfare and political considerations ranked primary among his perceived constraints.[47]

The former constraint, inherent to NATO, represents one legitimate mitigating factor that strategic and operational commanders may expect for as long as the US fights as a member of a coalition. Since United States doctrine suggests coalition membership as the future national approach to fighting, doctrine itself suggests that this trend will continue into the foreseeable future. This trend therefore suggests that the strategic leader's ability to employ information technology to dominate the physical domain ill remain constrained.

Clark also notes that political considerations also impacted his selection of targets for attack.[48] While clearly within the authority of the NCA, such activity serves to demonstrate a constraint imposed by information technology even as it delivers the increased capacity to strike targets throughout the operational commander's theater of operations. This example demonstrates the evolving struggle to reconcile the improved capacities of both strategic command and tactical capacity. In this example, the operational commander, represented by General Clark, provides the coordination between the two. His role remains at the operational level of war, yet one can see Professor Jablonsky's observation

of the decreasing autonomy of that commander in General Clark's observations.[49]

Congressional documents also note the Serbian adaptation to the air attacks targeting them.[50] Termed asymmetrical attacks in current terminology, the Serbian military's response to General Clark's operations was to attack civilian targets instead.[51] This asymmetry resulted because of the Serb's inability to confront directly those air forces attacking him even as they retained their flexibility to pursue the objectives they chose. While clearly demonstrating the increased capacity of information technology, such an example also demonstrates an unintended response, and one for which information technology in itself offers no ready solution.

In the physical domain, therefore, information technology reflects that the tremendous advances in tactical capacity it offers do not overcome Clausewitz' concept of friction. In this example friction manifests itself as an unintended consequence, the attack on civilian targets by the enemy. Without criticizing the US operation in Kosovo, such a development suggests that information technology in itself does not offer to make war easy.

This Kosovo example does demonstrate the significance that synchronization of events in time has to the commander in the field. As much as information technology enhances tactical capacity, it remains limited in its ability to simultaneously impact as desired all areas of a theater. This limitation expands the time available to the enemy to act in ways not desired by the operational

commander. As such this example demonstrates that the commander's ability to coordinate activities to achieve operational results remains significant.

Some of the observations from the Kosovo example indicate changes within the cybernetic domain of warfare as well. Cybernetics, the study of control systems, becomes increasingly significant with the increasing impacts of information technology over time. Control systems become increasingly significant as they increasingly rely upon improvements offered by information technology.

Systems such as the GCCS demonstrate the increased ability of the NCA to master the cybernetic domain of war using information technology. The term that captures this increased ability to command and control operations cybernetically is "situation awareness."[52] Situation awareness means the ability of a commander to see friendly force dispositions, detected enemy forces, and the terrain on one display.[53] Situation awareness is significant because it provides the means to observe activities in space, a prerequisite for coordinating those activities.

Situation awareness provides the strategic leader the potential to micromanage operations. Given the example of McNamara's micromanagement failing to deliver results, situation awareness' capacity to enable micromanagement suggests caution to strategic leaders located far away from the scene of battle. While micromanagement seems an unintended consequence of information technology, some military professionals suggest the inherent

wisdom of taking advantage of the capacity for centralized command and control in such a manner.

At the tactical level, one sees arguments contending that centralized command and control offers greater results than the current reliance upon subordinate initiative through mission tactics.[54] Captain Robert L. Bateman, in a 1996 *Armor Magazine* article argues that situation awareness offers to senior leaders the ability to apply their experience at lower levels.[55] Such a development, Bateman contends, enables better informed decisions that should in turn effect greater results.[56]

Extrapolated to the NCA level, such an argument offers that those with the greater overall awareness of the operation should make better-informed decisions leading to more efficient results. Such an argument portrays well the potential seduction of senior leaders by information technology. This argument ignores the increasing complexity of modern warfare as well as dismissing the significance of the moral domain of warfare. While the latter point, reminiscent of the experience with McNamara during the Vietnam War remains for further discussion, the former provides insight into the challenges of information technology and its ability to dominate the cybernetic domain.

M. Mitchell Waldrop, in his book *Complexity*, argues that his subject refers to "a great many agents interacting in a great many ways."[57] Modern warfare serves as a ready example of complexity. In some ways this complexity results from the intentional exploitation of information technology itself. The unintentional

results, however, suggest the limitations of information technology's ability to master the cybernetic domain of battle.

The intentional results come from the organizational and operational change information technologies add to commanders' duties at all levels. While information technology increases these commanders' capacity for work, one also finds that these technologies also add a number of agents, and therefore complexity to those commanders' duties.

One example of such agents comes from the additional information technology specialists required to operate and maintain information systems. A second example of additional interacting agents adding complexity comes from the increases in the commanders' battlespace and additional coordinating staff to manage information operations. The increasing amount of duties inherent in an information technology equipped force suggests increasing complexity in the commander's job.

These examples do not intend to convey a negative connotation of these capacities. A rational commander would and should seek to improve his capacity for work and to increase the number of options available to him. These examples suggest however that information technology does not necessarily make the commander's job easier. His job may become instead more complex.

Complexity added to the commander's job intentionally, with the purpose of increasing his capacity may impact the cybernetic domain in at least two ways. The first of these impacts implies that the commander may consume more time to accomplish his tasks in the future. The second creates greater requirements

for training commanders and validating their capability to handle this complexity. This observation implies a higher cognitive skill requirement for future commanders. This observation is fraught with implications to organizations such as the US Army Training and Doctrine Command (TRADOC), tasked to recruit and develop such commanders.

If such complexity arises from the friendly exploitation of information technology, then correspondingly potential adversaries would also add intentionally to a more complex environment. This implication reflects the experience in Kosovo as well as the insights of planners for the future. Field Manual 100-6, *Information Operations*, lists a variety of sources of future environmental complexity.[58] This manual also provides several techniques available for attacking information systems one suspect potential adversaries may employ.[59]

The *1998 AAN Report* likewise reports on potential sources of future environmental complexity. In addition to those factors listed within the physical domain by the report, such factors as the proliferation of long range precision weapons, the continued development of transnational actors, and the development of alliances by nations for the express purpose of mitigating US technological superiority may arise.[60] Each of these potentialities represents a source of complexity for future commanders at all levels.

Expected future complexity suggests that the information age may confirm the industrial age observation that modern warfare demands increasingly professionalized militaries. Samuel Huntington in *The Soldier and the State*

credits the industrial age for the development of professional militaries due to the inherent complexity of modern warfare.[61] Huntington's observation should gro even more in the future with the complexity accrues in fielding information technology equipped forces.

Even with this complexity, information technology may give commanders the ability to dominate the physical and cybernetic domains of their environment. Assuming that the commander a correct situation awareness, information technology should enable him to possess overwhelming combat power. Despite this potential domination of these to environmental realms, the three criteria of demographics, geopolitical factors, and technology still imply that the operational level of war will remain relevant. The moral domain of war, however, provides the most compelling reasons to predict the operational level of war's continued relevance.

The moral domain of warfare most closely reflects human nature and motivation. Within individuals and small unit organizations, one sees the scientific method over time applied through management studies. These pursuits lead to managerial theory applied with varying success in the Army. Concepts such as management by objective and total quality management reflect recurring periodic efforts to translate civilian managerial ideas into military organizations. While effective in peacetime, such approaches fail to address the implications the moral domain holds for close combat.

At the national level scientific approaches leave the realm of the managerial and enter instead that of sociology and political science. Although

sciences, these disciplines remain descriptive rather than prescriptive. This observation mirrors experiences in warfare from the Civil War to Kosovo.

In the Civil War many thought the war would end at the first battle.[62] Only after four years of fighting and unbelievable carnage did that end arrive. The later example of Kosovo lasted only seventy-eight days until the Serbs submitted to NATO demands, yet even this relatively short duration exceeded expectations.[63]

These examples provide anecdotal evidence of the significance of the moral domain on the operational level of war. The unpredictability of nations at war and the ability of adversaries to withstand the high costs of war defy predictability. The cited example of McNamara's attempts to reduce warfare in Vietnam to statistical management reinforces this point.

The moral domain of warfare remains decidedly immeasurable and resilient to scientific solutions. One needs merely to observe the endless volumes of articles and books on the subject of warfare to understand its inherent difficulty. Much of this unpredictability finds its roots in the moral domain of warfare.

Dr. Schneider's observation that demographic changes, geopolitical changes, and technological developments contributed to the development of the operational level of war manifested themselves within the physical domain. But the manifestation of these factors came only from the motivation found within the moral domain. Those nations that fielded large armies, joined alliances for mutual security, and invested in technology did so only after finding the motivation to survive in the moral domain.

Within these three domains of warfare, therefore, the causes that led to the operational level of war, demographic changes, geopolitical developments, and technological developments remain relevant today. While the physical and cybernetic domains provide areas in which information technology's greatest potential lies, both of these domains hold the potential for these gains to be offset by contrary developments. The Clausewitzian concept of the friction of warfare remains for future warfare manifest itself yet again, but potential sources of such friction seem apparent within current Army doctrine and in the writings of the Army After Next project.

The moral domain will remain immeasurably significant to the operational level of war in the future. History demonstrates that future predictions, if consistent with those of the past, will eventually lead to underestimation of the enemy's will and ability to withstand technology-enhanced forces. As the moral domain of war will remain unpredictable, it will demand the attention of a commander close to the battlefield sensing those immeasurable indicators of the enemy's will that can not appear on a computer screen.

CHAPTER FIVE

CONCLUSIONS

The operational level of war remains relevant in the future. The benefits available to strategic leaders who employ capable operational artists in this future seem to exceed by far the costs in resources of doing so. By maintaining regional combatant commanders with the flexibility to designate subordinate commands in their areas, strategic leaders receive the benefits of information technology available in the physical and cybernetic domains, while maintaining relevancy in the moral domain. They also distance themselves sufficiently from the military campaigns and operations to allow for their objectivity in directing national sources of power to achieve security objectives.

This conclusion implies many stipulations examined within the text of this paper. The first and perhaps most significant of these stipulations requires that the NCA recognize inherently the value of the operational level of war. Such recognition requires the voluntary delegation of authority to an operational commander to plan and execute distributed operations and campaigns. Failure to delegate this authority may succeed, but the example of Vietnam alone suggests caution in doing so.

Clearly the United States Constitution authorizes the President, as Commander-in-Chief to conduct military operations as he sees fit. This paper contends, and recent history in Vietnam and Kosovo demonstrate that these operations defy the simple solutions that information technology may seem to offer. The mastery of the complexities of the operational level of war learned

through a progressive career of education, training, and experience seems required to solve such complex problems.

This observation leads to a second requirement to maintain the operational art's relevance. Mastery of the operational art becomes immeasurably more difficult as information technology dynamically changes the complexities of war over time. This increasing difficulty change should require joint and combined education of future operational artists in order to produce officers capable of handling this complexity and coordinating the activities of assigned forces in time and space through the employment of distributed maneuvers and campaigns.

The use of regional commanders the United States employs seems to provide a reasonable approach to the evolving complexities of warfare. Not only can these commanders provide the flexibility to act within a particular region militarily; these commanders possess the ability to develop subordinate commands to optimize the capabilities of assigned tactical forces. Most importantly the continued United States presence throughout the world allows these regional commanders to better understand the potential affects of the moral domain on planned operations and so advise the NCA.

This last observation provides perhaps the most insightful deduction of this study. Employing the physical, cybernetic, and moral domains as a way to approach the relevance of the operational level of war precludes the almost magnetic attraction information technology promises in an environment unconstrained by immeasurable human factors. The discipline this approach

demands mandates consideration of human nature, and provides a rational way to demonstrate the continued relevance of demographics, geopolitical factors, and technology.

Whereas such factors contributed to the evolution of the operational level of war in the physical domain, they remain especially relevant within the moral domain. In the moral domain the behavior of man finds its origins. Individually, in small groups, in nation-states, or within alliances man seems determined to assure his security. Only from this motivation could the physical manifestation of the operational level of war come arise.

The demographics that enabled massed conscription armies did not represent a spontaneous event as much as a rational manifestation of this motivation. The system of alliances developed throughout and after the Napoleonic era also reflect this motivation as does the proliferation of technology. Each of these developments that appeared in the physical domain found their roots in the moral domain of warfare.

Ultimately the argument that the operational level of war is or is not relevant remains academic, abstract, and theoretical. The use of the operational level of war, as the Constitution and experience remind us, remains a voluntary and discrete decision that every president makes with each and every employment of the military. The responsibility for informing the NCA of the continued wisdom of the operational level's use resides with the military advisors to the NCA, the Joint Chiefs of Staff. These officers necessarily must maintain

the trust inherently needed to insure their recommendations remain relevant. Ultimately the relevance of the operational level of war falls into their hands.

ENDNOTES

[1] United States Army, FM 100-5, *Operations,* (Washington, D.C.: Government Printing Office, June 1993), 6-2.
[2]Ibid., 6-1 through 6-3..
[3] Advanced Military Studies Program, *Syllabus I Academic Year 1999-2000,* (Fort Leavenworth: KS: School of Advanced Military Studies, June, 1999), 57-71. This document provides a study guide for students of SAMS and uses these three domains. The author invokes these three domains later in the text to illustrate some unchanging factors of modern warfare that changing doctrine necessarily must account for.
[4] James J. Schneider, *The Theory of Operational Art*, (Fort Leavenworth, KS: School of Advanced Military Studies, 1 March 1988), 9-12.
[5] Ibid., 9-12.
[6] Ibid., 9.
[7] Ibid., 9-12.
[8] Schneider, *Vulcan's Anvil: The American Civil War and the Emergence of Operational Art*, (Fort Leavenworth, KS: School of Advanced Military Studies, 16 June 1991), 38-45. Schneider discusses Grant's campaigns of 1864-1865 as an example of this effect. Chapter three of this monograph compares Schneider's assessment of the origins of the operational level of war with others.
[9] Schneider, *The Theory of Operational Art*, 9.
[10] Ibid., 9.
[11] Ibid., 9-10.
[12] Della Thompson, ed., *Oxford Dictionary of Current English*, (Chatham, Kent, GB: Oxford University Press, 1998), 936.
[13] Martin Van Creveld, *Technology and War* (New York, NY: The Free Press, 1989), 218. Van Creveld very succinctly notes here that during the Industrial Revolution, "A transition took place from a situation in which inventions were for the most part not only exceptional but accidental and unexpected, to one in which technological change-and the anticipation of technological change-became the normal state of affairs." Van Creveld's chapter, appropriately enough, is titled "the invention of invention." This same idea of pre-cognition provides a useful analogy for the argument set forth by General Shimon Naveh about the origins of operational art discussed in Chapter three.
[14] Ibid., 1.
[15] Schneider, 9.
[16] David Jablonsky, *The Owl of Minerva Flies at Twilight: Doctrinal Changes and Continuity and the Revolution in Military Affairs* (Carlisle, PA: Strategic Studies Institute, 1994), 30. Jablonsky discusses the diminishment of the operational commander's autonomy in detail on this page using the Venn Diagram mentioned to relate the levels of war as covered in Army Manuals such as FM 100-5, *Operations*, pages 6-1 through 6-3.
[17] Ibid., 30.

[18] Field Manual 100-5, *Operations*, discusses the *National Security Strategy, National Military Strategy, the Unified Campaign Plan, and Joint Strategic Capabilities Plan (JSCP)* as "key sources for guidance for the combatant commander" on page 6-0. The role of the combatant commander and these documents are discussed in chapter three of this paper and the relative merits of these provide key discussion for the impacts of information technology on the operational level of war in chapter four.

[19] CPT Obediah Blair, "Update on Tactical Internet and Force XXI Battle-Command for Brigade and Below," *Army Communicator*, Summer 1998, 20-22. Blair discusses in this article evidence of bandwidth limitations that impact the performance of digital systems. This problem, analogous to the problem of flowing volumes of liquid through limited diameter pipes, remains a limiting factor in digital communications. One assumes that focused attention by the NCA would render such a problem irrelevant at the strategic level through development of redundant (parallel) systems and better systems procured through research and development or off the shelf.

[20] Carl Von Clausewitz, On War, ed. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 121.

[21] The works of Italian theorist Giulio Douhet serve as representative of these seminal debates on the role airpower. These debates continue today and parallel many of the concepts discussed within this monograph.

[22] United States Army, FM 101-5-1, *Operational Terms and Graphics*, (Washington, D.C.: Government Printing Office, 30 September 1997), 1-115.

[23] United States Army, FM 100-5, *Operations*, (Washington, DC: Government Printing Office, June 1993), 6-2.

[24] Shimon Naveh. *In Pursuit of Military Excellence: The Evolution of Operational Theory*. (Portland, OR: Frank Cass, 1997), 8-12. As discussed further in the text, Naveh considers only the formal adoption of operational terminology as definitive of the cognition of these concepts. Naveh goes on to address the irrelevance of defining an operational level of war, as the US did in the 1982 edition of *Operations.* Instead Naveh credits the US with deriving the operational concepts required in 1986 by invoking the term operational art in lieu of simply a level of war. The differentiation holds merit, but as the text discusses in reference to Grant's ultimate recognition in his campaign, ignores the fact that such sophistication only existed at the dawn of the industrial age through documents such as *The Official Records of the Civil War*. Doctrine as we know it today constitutes a decidedly post-industrial revolution invention and it is disingenuous to hold our predecessors to such a modern standard.

[25] Ibid., 10-12.

[26]Dr. Robert M. Epstein, *Napoleon's Last Victory: 1809 and the Emergence of Modern War*, (Fort Leavenworth, KS: US Army Command and General Staff College, 1992)., 15.

[27] Ibid., 31. Dr. Epstein claims the creation of these campaigns and armies linked campaign maneuver and battles whereas previous to this development armies could simply choose not to join battle thus retaining ultimate freedom of action.

Napoleon's response to the change precluded that option. Clausewitz suggests this change in warfare through his post-Napoleonic definition of war as existing to compel the enemy to do our will. One might wonder why Clausewitz would highlight this point if a common understanding of the term existed beforehand.
[28]Ibid., 31. Dr. Epstein's entire book pursues this premise, but it is on this page that he states Napoleon created the operational level of war by linking campaign maneuver and battles.
[29] Ibid., 31.
[30] Schneider, *Vulcan's Anvil: The American Civil War and the Emergence of Operational Art*, 42-45.
[31] Ibid., 38-45. Epstein, 8. While Schneider as a theorist discusses distributed maneuver, operations, and campaigns in a conceptual sense, Epstein defines distributed maneuver more precisely as "The deployment of divisions and corps and their maneuver through a theater of operations." The difference between the usage possesses academic significance, but from a theoretical standpoint mean about the same thing.
[32] Schneider, *Vulcan's Anvil: The American Civil War and the Emergence of Operational Art*, 42-43.
[33] Epstein, 263. Epstein discusses in his last chapter Napoleon's genius on achieving such an operational result but his insistent misbelief in the need for a single decisive battle. The latter observation provides insight into Napoleon's ultimate inability to have created what we know today as the operational level of war. Here Delbruck's ideas about the strategies of annihilation and attrition demonstrate a broader view of the Napoleonic and post-Napoleonic experiences. For an overview of Delbruck's concepts, see Gordon Craig's chapter on Delbruck in *Makers of Modern Strategy: From Machievelli to the Nuclear Age*. (Princeton, NJ: Princeton University Press, 1986), 326-353.
[34] Schneider, *Vulcan's Anvil: The American Civil War and the Emergence of Operational Art*, 42-43.
[35] Ibid., 42-43.
[36] Naveh, 8.
[37] Ibid., 8. See note 23 above for a discussion of Naveh's use of the term operational art versus operational level of war.
[38] Schneider, *The Theory of the Operational Art*, 9.
[39] Ibid., 9-12. This observation is discussed in detail in chapter three of this paper.
[40] Christopher Bellamy, *The Evolution of Modern Warfare*, (New York, NY: Routledge, 1990), 33.
[41] The United States Army Training and Doctrine Command, "*1998 Annual Report on the Army After Next Project*," (Fort Monroe, VA: Government Printing Office, 7 December 1998), 2. Document is available online at (http://www.tradoc.army.mil/dcsdoc/aan.htm).
[42] Ibid., 2-3.

[43] Van Creveld, 245-248. Van Creveld in this section scathingly indicts the McNamara era and the illogical results of the seemingly logical processes then used.
[44] Ibid., 245-248
[45] *1998 Annual Report on the Army After Next Project, 1-2 and 18.*
[46] US Congress, Senate, Committee on Armed Services. Capitol Hill Hearing With Defense Department Personnel, 21 October 1999, 13.
[47] Ibid., 13.
[48] Ibid., 13.
[49] Whether the operational commander's autonomy truly decreases calls to mind General Eisenhower's experiences with Prime Minister Churchill during World War II. In the interest of coalition warfare the men presented a unified front. Eisenhower notes in Crusade in Europe (see pages 85, 196-200, and 245 for examples) the frequent meetings and guidance, non-directive and directive he received from the Prime Minister in addition to his discussions with both General Marshall and President Roosevelt back in the United States.
[50] US Congress, House. *Kosovo Backgrounder.* (Available online at http://www.house.gov/hasc), 30 June 1999, 3-6 and 9.
[51] Ibid., 9.
[52] United States Army, FM 100-6, *Information Operations*, (Washington, D.C.: Government Printing Office, August 1996), 1-11.
[53] Ibid., 1-11.
[54] Captain Robert L. Bateman, "Force XXI and the Death of Auftragstaktik," *Armor 1*, January-February 1996, 13-15.
[55] Ibid., 13-15.
[56] Ibid., 13-15.
[57] M. Mitchell Waldrop, *Complexity*, (New York, NY: Touchstone, 1992), 11.
[58] FM 100-6, 1-1 through 1-6.
[59] Ibid., 3-1 through 3-16.
[60] *1998 Annual Report on the Army After Next Project*, 1-2 and 18.
[61] Samuel P. Huntington, *The Soldier and the State*, (New York: Vintage Books, 1958), 222-269. In this chapter Huntington focuses on the rise of military professionalism within the United States, a development he describes as unique in that it came from within the officer corps itself. Coincidentally Huntington claims that General William S. Sherman, Grant's Commander in the west when the operational level began, fathered led most of the professionalization efforts.
[62] Robert Leckie, *None Died in Vain*, (New York: Harper Collins, 1990), 158-159. Though quickly disabused of the notion after the First Bull Run, President Lincoln's initial call for volunteer forces consisted of ninety-day enlistments.
[63] US Department of Defense, *Joint Statement on the Kosovo After Action Review*, (Washington, DC: Office of the Assistant Secretary of Defense for Public Affairs, October 14, 1999), 1.

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