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**Time Estimation at the Operational
Level of War**

**A Monograph
by
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Air Defense Artillery**



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This monograph examines time estimation at the operational level of war. The study begins with a review of Classical Military Theory to identify the theoretical basis for time estimation. It next examines the Theory of Operational Art to discern significant differences between it and classical theory. This theoretical basis is used as a foundation to examine current approved doctrine relating to operational art focusing specifically on tasks requiring the estimation of time. The next chapter provides two historical case studies of failed time estimation: Napoleon's 1812 Campaign in Russia, and France's defeat in 1940. These historical examples illustrate the criticality of achieving harmony between the time-space-force calculations made by the commander and the nature of the conflict being fought. Organizations, processes, and technical					
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means define the set of resources available to the commander for this task. Should those tools be inappropriate to the nature or level of the conflict, failure is a likely result.

The monograph asserts that operational art is quantitatively and qualitatively removed from classical warfare. The core of its unique nature lies in its requirement for the arrangement in time and space of simultaneous and sequential military operations using discrete air, land, sea, and space forces. Time-space-force considerations at the operational level of war are therefore multi-dimensional. The tools of the operational artist should therefore be designed to support decisionmaking in this environment.

The study concludes that adequate tools to assist operational commanders in estimating time-space-force requirements do not exist. It argues that failure to develop such dedicated tools is likely to force operational commanders to use tools developed to support tactical vice operational level decisionmaking. The use of such single dimension tools is not likely to answer the operational commander's time-space-force questions or provide the foundation for planning future operations; they may, in fact, prove dangerous.

The study recommends that Joint and Service studies be conducted to develop useful tools which would support operational level decisionmaking, in general and time estimation, in particular. Furthermore, it suggests that the nature of warfare is undergoing revolutionary changes today which may render current concepts obsolete. It argues for a priority study to assess the effects of the Microelectronic and Informational Revolutions on the nature of war, and especially, upon time-space-force considerations. It also recommends creation of a Joint School of Advanced Military Studies, argues for development of a comprehensive theory of conflict, and calls for greater emphasis on the development of Joint doctrine.

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ABSTRACT

TIME ESTIMATION AT THE OPERATIONAL LEVEL OF WAR by Major Alan D. Landry, USA, 54 pages.

This monograph examines time estimation at the operational level of war. The study begins with a review of Classical Military Theory to identify the theoretical basis for time estimation. It next examines the Theory of Operational Art to discern significant differences between it and classical theory. This theoretical basis is used as a foundation to examine current approved doctrine relating to operational art focusing specifically on tasks requiring the estimation of time.

The next chapter provides two historical case studies of failed time estimation: Napoleon's 1812 Campaign in Russia, and France's defeat in 1940. These historical examples illustrate the criticality of achieving harmony between the time-space-force calculations made by the commander and the nature of the conflict being fought. Organizations, processes, and technical means define the set of resources available to the commander for this task. Should those tools be inappropriate to the nature or level of the conflict, failure is a likely result.

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CHAPTER 1

THE PROBLEM

I may lose a battle but I shall never lose a minute.

Napoleon Bonaparte¹

INTRODUCTION

This study grew out of a year-long effort to differentiate between tactics, operational art, and strategy. The lessons of history seemed to suggest that time and space considerations were central to the distinctions. More to the point, while time and space considerations at the operational level were clearly derived from those of classical military strategy, they also seemed to be unique - and therefore uniquely important to the practitioner of operational art. As our studies and exercises continued to illustrate, time estimation at the operational level was also an enormously complex task for modern commanders and staffs, yet operational success hinged on its successful completion. Neither historical studies nor practical exercises, however, shed much light on the specific processes or importance of time estimation, its many facets, or upon the tools available to assist the commander in its execution. In the absence of such basic information, it was deceptively easy (and perhaps incorrect) to assume that time estimation belonged solely to the province of creative art rather than to scientific calculation. That assumption, however, did not seem to be consistent with the evolving complexities of modern war, or of the requirements of command in such war. Given these increasing complexities, is time estimation scientific, artistic, or both? Is it critical to operational art or not? Can its effects be mitigated? What is the relationship between uncertainty, acceptable risk, and time estimation?

The purpose of this study is to examine these issues - to explore time estimation at the operational level and illuminate the relationship between time estimation and success in the practice of operational art. That practice has historically involved the planning and conduct of large unit operations and campaigns to achieve strategic objectives. Embedded within these tasks are multiple decisions concerning campaign initiation, duration, tempo, selection and sequencing of operations, sustainment, and force selection. Time estimation appears to play a critical role in each, but the dynamics of that role are unclear. This study also seeks to determine whether means to aid commanders in estimating time have been fully developed or properly utilized. It

addresses the degree to which practitioners of operational art have been left to their own devices ("coup d'oeil" principally) for estimating time factors in the planning process, and assesses whether that is adequate for modern warfare.

Such analysis may provide modern commanders with insights for understanding the importance of time estimation in operational success and failure. Furthermore, extracting and isolating specific critical requirements for time estimation in the campaign planning process can facilitate the development of organizations, processes, and technical means properly designed to assist modern commanders in this increasingly complex area.

METHODOLOGY AND STRUCTURE

The first section of this study focuses on identifying the theoretical basis of time estimation. The works of classical and modern military theorists are examined to distinguish between operational and tactical considerations. This provides the essential conceptual basis for assessing and analyzing operational level doctrinal requirements involving time estimation.

From this theoretical and doctrinal foundation, the study proceeds to an historical analysis of two significant failed campaigns to isolate time estimation as a partial cause of the failure. Napoleon's Russian Campaign (1812) and the Battle of France (1940) are examined. This historical survey leads to an examination of approved doctrine to identify the integration of time estimation with operational activities.

Finally, the study offers conclusions and recommendations which might prove useful to modern operational commanders.

EVIDENCE

While this study argues for a more considered approach to time estimation (and to all other aspects of the staff estimate process at the operational level), it does not offer either theory or history as proof. The research does not provide indisputable proof that erroneous time estimation has ever directly lost a campaign or a war. It hints, it teases, and it suggests. Both Classical and Operational Theory do indicate that time estimation underlies many important military activities. Even a rudimentary reading of military history offers many insights into the potential rewards of accurate time estimation and the costs of inaccuracies. But the conclusions the reader draws must ultimately be personalized to have effect. The theory is drawn from the

works of recognized authorities in both Classical and Operational military theory. The historical vignettes are drawn from historians of sound reputation. Doctrine, of course, is what is presently articulated in the Army's capstone doctrinal manual, FM 100-5, Operations.

All this is simply to suggest that evidence establishing a role for time estimation in operational warfare does exist. It also seems to argue that a high price can be paid when the organization, processes, and technical means of the commander do not match the level of war he is required to fight. But it does not prove that time estimation is the key to success at that or any other level of war. As Clausewitz so clearly cautioned almost 200 years ago, there can be no easy answers, no recipes, no cookbook solutions to the equation of war.² Those who would seek such comfort will find proof in these pages that is not intended.

CHAPTER 2

THEORETICAL CONSIDERATIONS

Unless we understand as a profession the distinction between classical military strategy...and operational art, "loose marbles,"...will continue to rattle down our doctrinal corridors.

James J. Schneider³

Time lost is always a disadvantage that is bound in some way to weaken him who loses it.

Carl Von Clausewitz⁴

The purpose of this section is to examine the theoretical underpinnings of time estimation for both classical military strategy and operational art. It begins with an important caveat. There are many who believe that the U.S. military currently lacks a coherent theory of war. This is supported by the lack of any existing official document on military theory or even of a generally accepted theoretical body of knowledge within the defense community. Students of military theory are thus required to develop their own theory of war. This is not all bad. However, it does allow unusually broad license to the modern military theorist while presenting the novice with an almost unbounded problem. To resolve this dilemma and provide a more useful point of departure for analysis, this study adopts Clausewitz's propositions on the utility of theory provided in his problematic masterpiece On War as a start point: ⁵

- (1) theory should not provide a manual for action.
- (2) it fulfills its main task when it is used to analyze the constituent elements of war and distinguish the important from the unimportant.
- (3) theory should be study, not doctrine.
- (4) it should educate the mind of the commander, or more accurately guide him in self education.
- (5) it does not "lay down precisely the path he must take."

With these general cautions in mind, we begin to examine classical military theory to differentiate it from operational art.

SECTION 1: CLAUSEWITZ AND TIME - CLASSICAL THEORY

The classical theory of war is normally associated with Clausewitzian theory, and that is frequently (though incorrectly) thought to pertain exclusively to Napoleonic warfare.⁶ What Clausewitz intended was nothing less than an all-

encompassing theory of warfare universally applicable to any circumstance, time or place.⁷ This study contends that while many of his propositions remain relevant, his notions about time are obsolete and no longer descriptive of time considerations in modern warfare. To develop this proposition, major elements of Clausewitz's theory which illuminate his thoughts on time will be considered.⁸

The initial chapter to Book One of On War comprises twenty-eight brief sections intended to "serve the whole by indicating the direction I [Clausewitz] meant to follow everywhere."⁹ Indeed, this single chapter - the only one Clausewitz considered finished¹⁰ - serves as the best guide to the entire theoretical work because of the clarity and depth of thought it reflects.¹¹ It therefore serves as a springboard for this analysis. Key points are generally discussed in the order in which they appear in the text.

Much of Clausewitz's early discussion develops a theoretical construct for ideal war and then describes how and why reality falls short of that absolute (the primary dialectic of the work). Notions concerning time and space appear throughout. Clausewitz first defines war as "an act of force to compel our enemy to do our will."¹² That force is a composite of "inventions of art and science," - the means to render an enemy impotent.¹³ In his theoretical extreme (absolute war), there is no logical limit to the application of force. It is in this action/counteraction that Clausewitz introduces the notion of war as a contest of opposing wills, the "collision of two living forces"¹⁴ carried out by the means provided by art and science.

This collision takes the form of battle. Notwithstanding Clausewitz's eloquent development of the value of the single decisive battle ("great battle") in Book 4,¹⁵ he clearly states in this initial section that "war does not consist of a single short blow, because it is not possible for a nation to deploy all its resources (defined as fighting forces, the country's physical features and population, and its allies) at the same time."¹⁶ The nature of war precludes the "simultaneous concentration of all forces,"¹⁷ no matter how militarily desirable that might be. Given the highly developed nature of this initial chapter, the reader may conclude that while Clausewitz viewed the single decisive battle (Hauptschlacht)¹⁸ as the most effective and preferred means to achieving strategic ends, a series of battles was a more likely result. Even at that time, Clausewitz acknowledged that these might be simultaneous or sequential battles conducted over time to achieve desired strategic objective(s).¹⁹

The nature of such contemporary battles was a direct consequence of the general parity of European armies in terms of military organization, equipment, methods, and motivation.²⁰ Clausewitz recognized that the character of battles

would remain unchanged only so long as those conditions existed, and that a change in the nature of tactics would automatically react on strategy.²¹ However, as he wrote at the very beginning stages of revolutionary change, a description of how future inequalities might alter the characteristics of either tactics or strategy is not provided.

Clausewitz also devotes considerable attention to the dominant role of the political object in determining both the military objective and the amount of effort required to attain it.²² Curiously, however, while he identifies the moderating effects of the political object on the scope of the military effort, he does not discuss its potential time impacts (such as delays in the initiation or conduct of military actions). Suspension of military action is, however, addressed, as a potential military consequence of "waiting for a better time to act."²³ Clausewitz conceptualized war as a discontinuous activity with inactivity primarily resulting from the superiority of defense over attack.²⁴ Time estimation is at the heart of this matter. A weaker force chooses to defend, and in so doing, accrues certain advantages by using time to build its strength. These advantages are not available to an attacker whose strength, of necessity, dissipates over time through positive action. This describes the theoretical concept of culmination, defined as that point in time when "the defender must make up his mind and act, when the advantages of waiting have been completely exhausted."²⁵ Conversely, offensive culmination is reached when "remaining strength is just enough to maintain a defense and wait for peace."²⁶ Clausewitz continues: "Beyond that point the scale turns and the reaction follows with a force that is usually much stronger than that of the original attack."²⁷

Time is also central to Clausewitz's contention that inaction results from the commander's imperfect knowledge of the situation.²⁸ Failure to appreciate whether the initiative lies with oneself or with one's opponent "is as likely to lead to ill-timed action as to ill-timed inaction...,"²⁹ both of which represent time estimation disorders. Thus, the ability of the commander to correctly estimate the complex battle situation is central to his ability to take timely and appropriate action, yet this will not result from calculation. Interestingly, Clausewitz contends that the nature of man is to overestimate his opponent; thus, ignorance of the situation delays the progress of military action and moderates its tendency to the extreme.³⁰

After Clausewitz describes these various qualifiers to the practical execution of war, he concludes that their net result is to force commanders further from theoretical extremes and toward considerations of "probability and inference...calculated in the light of circumstances..."³¹ Probability and

inference represent domains of the art and science of war. Furthermore, because chance is never absent in war, war is ultimately a gamble in which "guesswork and luck come to play a great part..."³² To Clausewitz, war exists in the element of danger where courage interacts with chance; absolute (mathematical) factors are not effective for military calculations in this medium.³³ It is here that Clausewitz reveals the combative tone of his work as a counter to doctrinaire and prescriptive theorists, notably Jomini and Henry Lloyd.³⁴

This bias is clearly evidenced in Clausewitz's deductions regarding time estimation. Clausewitz thought it impossible to eliminate uncertainty from the time-space-force equation, nor could it be resolved through scientific calculations. Moreover, the very presence of uncertainty provides the commander with unique opportunities where courage and self-confidence can "take wing and dive into the element of daring and danger like a fearless swimmer into the current."³⁵ The implication is that scientific calculations are of secondary importance to inferences derived from the commander's art. Within such a construct, the outcome of war rests more on the creative genius of the commander than on anything else. Let us consider his tasks.

The commander and statesman are assigned what Clausewitz terms "the first, the supreme, the most far-reaching act of judgment" - to establish the kind of war they intend to wage, "neither mistaking it for, or trying to turn it into, something that is alien to its nature."³⁶ As Clausewitz terms this the first, and most comprehensive of all strategic questions,³⁷ it is useful to consider his discussion of strategic tasks in Chapter 8, Book One. Clausewitz asserts that:

superiority of numbers...is the most important factor in the outcome of an engagement....as many troops as possible should be brought into the engagement at the decisive point."³⁸

The tasks of the general clearly emerge: determine the time and place of the engagement, and determine the forces to be used. These activities define the purview of classical strategy - in their execution, the outcome of the engagement is largely decided.³⁹ While the science of war might furnish the commander with useful calculations, the time-space-force equation could not be adequately answered by scientific means.

After establishing the necessity of fielding the "largest possible army into the field," Clausewitz admits that the size of the army would likely be "given" to the commander by the political power he represented; therefore, to achieve relative superiority at the decisive point when overall superiority was

impossible depended on the commander's "calculation of time and space as the most essential factor."⁴⁰ While Clausewitz admits that "the equation of time and space appears as the most essential factor," and is "the daily bread of strategy," he concludes that "it is neither the most difficult nor the decisive factor."⁴¹ He asserts that strategic miscalculations of time and space have seldom led to serious defeat.⁴² He contends that victory often has had little to do with the ability to "calculate the relationship of two such simple [emphasis added] elements as time and space."⁴³ Perhaps this disclaimer is simply another manifestation of Clausewitz's attempts to distance his theory of war from the prescriptive, doctrinaire concepts in vogue.⁴⁴ According to Peter Paret's Clausewitz and the State, Clausewitz's war of words "stands at the beginning of his theoretical work, and he carries on debates with the past and present literature throughout his life."⁴⁵ In any case, it is evident that Clausewitz associated calculations of time and space with formulas and axioms offered by others as easy solutions to the conduct of war that he deemed invalid and inappropriate. He clearly sought to distance his theory of war from such distractions.

Clausewitz distinguishes between two levels of activity in the conduct of war - strategy and tactics - which are central to all time-space-force considerations.⁴⁶ This division of war into two levels was limited by the accepted thinking of his day.⁴⁷ In his construct, tactics involved the "use of armed forces in the engagement," while strategy concerned the "use of engagements for the object of the war."⁴⁸ The engagement was a single event, limited in time and space.⁴⁹ It did not include those activities "preparatory to battle," such as the creation, training, and maintenance of fighting forces.⁵⁰ Furthermore, Clausewitz viewed the division of war into strategy and tactics as a theoretical device rather than a practical necessity. He did not expect these distinctions to translate into direct results on the battlefield.⁵¹ He did link tactics and strategy as "two activities that permeate one another in time and space but [which are]...nevertheless essentially different."⁵² This difference between time, space, and force considerations at different levels of war would assume tremendous proportions and profound significance not addressed by this theory as the nature of war was revolutionized after Clausewitz. War had not yet transcended the bounds of the gifted commander. That this assessment seems to be wholly at odds with modern concepts of warfare says much about the changed nature of conflict and the increased complexity of the time-space-force equation since Clausewitz's day. This is developed in the next section.

SECTION 2: OPERATIONAL ART - A CHANGED CONSTRUCT FOR THE THEORY OF WAR

The theory of major operations (strategy as it is called) presents extraordinary difficulties, and it is fair to say that very few people have clear ideas about its details - that is, ideas which logically derive from basic necessities [emphasis added].⁵³

This study contends that the "basic necessities" Clausewitz referred to irreversibly altered the nature of war as it evolved after his day. It asserts that Clausewitz's theory of war is essentially one-dimensional. At its heart, this theory conceptualized warfare as the employment of single large unitary armies pitted against one another in campaigns composed of engagements, ideally expressed in the "Hauptschlacht." Furthermore, Clausewitz's theory of war simply ignored war at sea, and the economic dimensions of war, although his principal study, Napoleon, was sorely challenged by these means. As societies were stretched through industrial, political, social, technological, economic, and informational revolutions in the years after his death, Clausewitz's notions fell out of touch with the realities of conflict - the ways, means and ends by which nations influenced one another. Vastly different notions regarding the ways and means to achieve strategic ends appeared. As a result, the Clausewitzian notions of time, space and force (the three variables in the equation of war) examined in the previous section were irreversibly altered. In the process, the impact of time estimation in war changed qualitatively and quantitatively.

The purpose of this section is to compare and contrast Classical Military Strategy and Operational Art. The framework for analysis is a construct of war which considers the physical, cybernetic, and moral domains of battle.⁵⁴ Through this analysis, the changed equation of war, and its time component in particular, will be examined.

As Napoleon first unleashed the potential of a modern nation state in his campaigns against an unprepared Europe at the beginning of the 19th century, war's growing capacity to alter societies began to emerge. Changes to warfare occurred at the juncture of two pivotal 'revolutions' in the history of mankind. The French Revolution established an ideologically motivated national citizenry-in-arms in place of the small professional armies of kings in the 18th century. The passing of the baton portended disturbing changes to the formerly-limited aims of the wars of kings. Citizen-soldiers seeking to

fulfill idealistic national aims through war were not restrained as the monarchs had been, nor were their resources. The Industrial Revolution provided the tools (and perhaps the motivation) to achieve unlimited ends for the first time.⁵⁵

In his reflections on the campaigns of Napoleon and Frederick the Great, Clausewitz became the first to attempt a comprehensive theoretical treatment of war. In the 160 years following his death, cataclysmic and wholly unpredictable technological, political, sociological, economic and informational changes shook society in the wake of those revolutions and fundamentally altered warfare. The theoretical construct developed to account for the changed nature of war is known today as "operational art." On the surface, this construct simply appears to add an intermediate layer of "operational art" between the two layers of "strategy" and "tactics" recognized by Clausewitz as completely descriptive of wars in his age. Comparison with classical military strategy in terms of the domains of battle, however, reveals operational art to be a qualitatively and quantitatively distinct theoretical construct with critical implications to the "equation of war."

In classical military strategy, wars consisted of battles and engagements generally fought by relatively small (in today's terms) professional armies to achieve the limited objectives established by monarchs. Battles and engagements (the domain of tactics) were the building blocks to achieve strategic ends.⁵⁶ Strategy was the art of campaigning - of making use of time and space in the words of Napoleon⁵⁷ - it was inherently limited to the concept of the campaign. It involved the planning and execution of moves: (1) to bring opposing armies into contact, (2) to deploy forces before battle, (3) to use reserves, and (4) to exploit after the battle.⁵⁸ Unitary armies maneuvered unobstructed to the field of battle, massed unhindered, then engaged in decisive battle. Although a state might possess more than one army, a decisive battle generally determined the campaign which determined the war. The conduct of the war and the fate of a state thus could be determined in a single intense event. The Classical Military Strategy articulated by Clausewitz is perhaps best understood as the Strategy of a Single Point where single concentration of forces in time and in space produced decisive results.⁵⁹

The physical characteristics of battle in this theoretical construct are best described by the term "constrained," although this should not be misinterpreted as non-lethal.⁶⁰ Armies and their activities were constrained by size, capabilities, weaponry, logistical support, time, space, and distance. Trafficable terrain, daylight hours, and favorable seasons generally described the environment of battle. Night, poor weather, and the onset of winter snows

and spring thaws defined natural pauses in engagements, battles, and campaigns. Most armies were similarly outfitted and enjoyed the same capabilities and limitations of the weapons of the day. Furthermore, the general mobility of armies was limited by the large trains that were required to sustain them in battle; this set quantifiable limits on the length and duration of campaigning for all combatants alike.

Because of these constraints, the commander directly controlled his forces aided by a linear battlefield, frontal engagements, and single battles. Planning, while not an easy task, assumed none of the proportions which would be required by operational art. From the strategic level of the campaign to the tactical level of the battles and engagements, the commander planned and directed the activities of the army. As with the physical domain, the cybernetic domain envisioned no important role for individual soldier initiative or decisionmaking. The army was directed by the singular will of the commander to converge upon the single point where a decisive battle could achieve strategic results. Classical military strategy thus placed a premium on generalship. The Strategy of a Single Point facilitated a command and control system of essentially singular means and methods of high risk, great uncertainty, and unequalled payoffs for the right person who could assemble the right force at the right place and time.

In the moral dimension of battle, classical military strategy emphasized the dominant role of the combined effects of fog, friction and uncertainty on the outcome of the fighting. Perhaps Clausewitz's most enduring contribution to the theory of war was his clear articulation of these intangible determinants of battle. The skill and personal qualities of the commander could reduce these elements to manageable levels. Even so, more than with any other field of human endeavor, the moral domain of battle would always affect the ability of the force to achieve success.

In summary, classical military strategy was dimensionally flat; it finds its clearest articulation in the theoretical writings of Clausewitz. It is essentially singular in its treatment of time, space, and force. It was dominated by the single event. In such a construct, command and control and moral uncertainties found greatest resolution in the skill and genius (coup d'oeil) of the commander. Calculations, to include time estimates at the tactical and strategic levels, aided the commander's understanding of the situation, but they were not decisive. On the other hand, the Strategy of a Single Point depended disproportionately on the commander's genius.

This view of war is fundamentally different from that envisioned by operational art. Operational art is "the employment of military forces to attain

strategic goals in a theater of war or a theater of operations through the design, organization, and conduct of campaigns and major operations."⁶¹ As such, it roughly equates to the classical level of "strategy," yet qualitative differences resulting from the combined effects of the Industrial and French Revolutions separate the two notions of war.

Profound changes in the concept of war are apparent in the physical domain of battle.⁶² As previously noted, the French Revolution substituted an ideologically motivated national citizenry for the small professional armies of sovereigns. Thus, classical armies differed in terms of available numbers (mass), in accessibility (via mobilization), in complexion (elements of society represented), in motivation (nationalism), and perhaps in ability (level of professional training) as citizens took to war. The Industrial Revolution gave the nation-in-arms the physical capital to execute total war in terms of weapons, militarily-significant technology, transportation, mobilization, communications and organization. Weapons could be mass produced in quantities to arm an entire nation. They were more capable as well. The introduction of the rifled musket, breech loading mechanisms, smokeless powder, and conical projectiles extended the battlefield in length and in depth and rendered densely massed formations obsolete.⁶³

The increased range and lethality of these weapons made aimed fire dominant, and with it, the responsibility of the individual soldier for increased battlefield frontages grew. In On Infantry, John English states that in 1800 roughly 20,000 men were required to hold a single mile of frontage.⁶⁴ This was reduced to 12,000 men by 1870; 2,500 by 1917; and less than 1,000 today. As frontages were extended to reflect the tactical implications of these new weapons, dispersion replaced concentration and the distributed battlefield was born.⁶⁵ On this expanded battlefield, the defense gained enormous advantage as the tools of the offense (mass, concentration, firepower) were emasculated by the power of the shovel and the rifle.⁶⁶

Simultaneously, after Napoleon, most armies grew to enormous size and ceased to be unitary bodies. Nation-states fielded many armies of several corps that could be articulated as distinct units within a single, or multiple, theaters.⁶⁷ The invention of the railroad allowed (in fact, assured) the distribution of these armies along the periphery of national boundaries and facilitated the establishment of a continuous front. It also deepened the theater of operations to reflect its expanded base of support. The telegraph provided the technical means to command such laterally dispersed forces. A distributed logistics structure ensured their sustainment. Over time, further technological improvements would open the dimensions of air and space to the

operational commander enhancing his capabilities while complicating his planning and increasing uncertainty still further.

Decisive battle no longer seemed a possibility on the temporally and spatially distributed battlefields.⁶⁸ Victory in battle simply did not bring strategic results as before. Wars consisted of campaigns, campaigns consisted of combinations of operations, and operations consisted of multiples of battles and maneuvers, all separated in time and space.⁶⁹ The single campaign no longer defined the purview of strategy. Nor did it define the boundaries of planning which had to expand to consider complex combinations and multiples of combinations. The equation of war, and time considerations, were irreversibly altered by these changes. Armies defeated on distributed battlefields simply brought up strategic or operational reserves until adequate reinforcements could be mobilized and transported to the front(s). The Strategy of a Single Point became obsolete as nations proved their willingness and ability to employ national armies along continuous fronts and fight in battles extended in time, space, distance, and resources. Simultaneous and sequential operations replaced the decisive battle as the basic building blocks of strategic success. Maneuver was no longer relegated to a supporting role, but could be undertaken as an end to strategic success in its own right. Moreover, the nation-in-arms ensured the availability of the entire resources of the state to sustain such operations until the will of the opposing force collapsed or until its own store of resources was depleted. In short, the Strategy of Exhaustion⁷⁰ became a legitimate (if less romantic) possibility, and sustainment and logistics were necessarily elevated as co-equals with combat operations in the realm of planning at all levels. Time and space considerations could not be seen in the simplistic manner possible under classical theory.

Operational art introduced significant changes to the cybernetic domain of war affecting the equation of war, and time considerations as well. The operational commander had to plan and integrate combinations of simultaneous and sequential operations conducted by dispersed armies throughout the depth and breadth of the theater of operations rather than single operations in single campaigns in a theater of operations.⁷¹ Each tactical action had to set the stage for follow on operations, forming an indispensable part of the whole campaign. The requirement for operational genius to design and integrate these complex activities into a cohesive package is evident. It is equally evident that such genius was dimensionally removed from classical genius in terms of complexity, depth, and scope of vision required to arrive at a proper balance of time, space, and force within the equation of war. The dilemma is that the operational commander was less capable of exercising direct control

over the entire army either on or off the battlefield due to the expansion of both in size and space. He was further inhibited from influencing the immediate battle because he was required to shift the focus of his energies from the current tactical action to future operations.⁷² A focus at the tactical level could only come at the expense of the operational level tasks - its essential price was to mortgage the campaign (and perhaps the war) for a battle victory. In post-Napoleonic war, the operational commander's vision provided the ultimate and essential rationale for every tactical action. Without it, tactical actions would lose focus and purpose becoming disjointed acts with no meaning beyond the senseless loss of resources.

Given these increasing complex responsibilities, the commander's influence might still be considered decisive, but it was clearly no longer direct. To compensate for span of control limitations, many organizational and technological devices were developed over the years. The most significant of these was the creation of the General Staff and subordinate staffs which distributed the administrative, planning, and war fighting tasks of modern national armies.⁷³ The professional staff became indispensable. Without one, the operational commander would quickly be overwhelmed in information and detail, exceeding his span of control and leading to the failure of his plans. Through these staff elements, however, he could indirectly achieve the fruition of his vision, if he retained sufficient situational awareness and did not become victim of the staff or of his physical separation from the front. In its most basic form, the distributed battlefield demanded distributed command and control means which removed the commander increasingly from tactical action and the immediate battle so that he could focus on the pattern rather than the parts. This isolation from the action further complicated the operational commander's ability to resolve the equation of war while simultaneously increasing the importance that he do so correctly. Failure to harmonize time, space, and distance for major operations and campaigns had quantitatively and qualitatively different consequences than it did in classical military theory.

Perhaps as significant to the cybernetic process as the creation of the staff was the development of separate field armies and army group headquarters. The field army provided the organizational means to exercise command and control over the large forces designed to fight separate operations. The army group was designed to integrate the separate operations of the armies and tie them together in a single concept of operations.⁷⁴ This also represented a qualitative and quantitative leap from classical military strategy in that it envisioned the articulation of separate armies simultaneously in different operations to achieve strategic objectives. In turn, the army com-

manders conducted simultaneous and sequential battles and maneuvers aimed toward operational objectives. Command and control of such operations introduced significant demands on commander and staff alike to achieve total integration in time, space, and distance - demands that were not present when the only concern of the commander was the single decisive battle.⁷⁵ Phases, branches, and sequels all involved the estimation of time in a relational (BLUE versus RED) setting, further complicating the task of the operational commander.

The moral dimension of operational art is also strikingly complex and vital to the time-space-force equation. As with classical military strategy, it is concerned with the disintegration and breakdown of will. However, of all the domains of battle, the changed nature of warfare appears to have most profoundly affected the moral domain of battle.⁷⁶ Behind the increasing physical and cybernetic complexity of the battlefield lurk the same elements of uncertainty, fog, and friction that so defied Clausewitz's quantification. Yet these elements have been expanded at least in direct relation, and perhaps geometrically, to societal changes. Ironically, the democratization and liberalization of societies which made large armies possible reduced the psychological preparedness of the soldier (and his society) to endure hardship at the same time the distributed battlefield stripped him of his fundamental base of support - a nearby fellow soldier. Further depletion of moral capital has resulted from the increased distancing of the soldier and his fight from the commander and his operation. The operational artist must also contend with the conflicting realities of an ever more complex battlefield which demands intense peacetime preparation and increasing roles for less-well trained militia armies. The role of the press, the increasing political content of military activities at all levels, the dehumanization of killing by long-range precision weapons of great destructive potential, and the erosion of the line between combatants and non-combatants represent but a few of the host of "new" factors which affect the moral cohesion of an army, and bear ultimately on time-space-force considerations. It is clear that the successful operational artist must be cut from unusually sturdy, flexible, and skilled stock. Even so, that artist must be able to sustain depth and breadth of vision in an environment of multi-dimensional uncertainty.

The lesson of all this must be more than lamentation. Operational art, in its reflection of war, is fundamentally expensive to society - it taps the core of a nation's treasury in its extended definition as the repository of national power and will. It demands a willingness to fight to exhaustion, or alternatively to find new ways to resolve conflict. For the military officer, reflection

about the changed domains of battle indicates the increased value and enhanced importance of relationships, definitions, and theoretical constructs to understand the phenomena of war as it can be rather than as we would wish it to be. It confirms the assertion that cookie cutter solutions are not possible - they are ineffective at best, and destructive at worst. Like Clausewitz, the realities of operational art caution against prescriptions and predictions. The roles of uncertainty and chance have grown exponentially, and the road of firm answers is consequently paved with severe risk. Yet, in all this, the commander is clearly no longer able to handle the complexities of war alone. He can not simply rely on "coup d'oeil" to resolve the time-space-force equation at the operational level. There will be no new Napoleon because there can be no return to the conditions which gave reign to his singular ability. Just as certainly, to operate even on the margins of victory, the modern operational commander can turn his back on neither operational art nor operational science.

SECTION 3: OPERATIONAL TASKS

The tasks which fall out of the preceding analysis bear little resemblance to those faced by Frederick or Napoleon. In his article "The Loose Marble - and the Origins of Operational Art," Professor James Schneider states that the hallmark of operational art is the integration of temporally and spatially distributed operations into a coherent whole.⁷⁷ However, the simplicity of those words belies the enormity of the task. The model he develops to summarize the characteristics of operational art provides an excellent point of departure for determining how extensive those tasks are. In his analysis of the American Civil War, Professor Schneider identifies the following "emergent" characteristics of operational art:

- (1) several independent field armies distributed in a theater of operations.
- (2) a quasi-army group headquarters established for overall control.
- (3) an appropriate logistics structure to support distributed operations.
- (4) an integrated campaign plan for distributed operations.
- (5) distributed operations which contribute to overall campaign objectives.
- (6) the strategic employment of pursuit/exploitation forces to facilitate future operations.
- (7) deep strike operations.
- (8) multi-Service or Joint operations.
- (9) distributed free maneuver.
- (10) continuous front.
- (11) distributed (expanded) battlefield.
- (12) operational vision.

The reader may challenge inclusion of one or more of these points. The items are not presented as an all-exclusive or "required" package. It is representative of some basic concerns of the operational artist. These are the paints he must use in his art, and the variables he must consider in his science. Further insights are provided in a follow-on study Professor Schneider prepared on "The Theory of Operational Art."⁷⁸ In that document, he details key differences between Classical Strategy and Operational Art:⁷⁹

CLASSICAL STRATEGY	OPERATIONAL ART
1. Armies maneuver to contact.	1. Battles begin at national borders.
2. Singular armies.	2. Multiple armies.
3. Decisive battles.	3. Indecisive battles.
4. Logistics considered only at start of campaign.	4. Logistics forces pause before decisive pursuit.
5. Decisive pursuit follows battle.	5. Last battle only decisive battle.
6. War consists of single campaign.	6. War consists of many campaigns; campaigns of distinct operations; operations of distinct battles and maneuvers.
7. Commander sees whole battlefield.	7. Commander sees little of many simultaneous battles.

This excellent summary again confirms the multi-dimensional time-space-force considerations of the operational commander as he plans and executes campaigns and operations. His unique requirements to plan and execute simultaneous and sequential activities in time and space with discrete force packages in the mediums of space, air, land and sea toward a singular operational vision contrast markedly with the single dimension requirements of the classical strategist. Clearly, these are quantitatively and qualitatively removed from the command requirements envisioned by Clausewitz. Time estimation is an integral, where not decisive, component in each of these operational considerations.

We depart momentarily from the realm of theory to enter the realm of doctrine. Specific guidance on essential tasks of the operational artist are detailed in FM 100-5, Operations, the Army's capstone doctrinal manual. Although in my opinion the manual fails to convey an adequate reflection of the magnitude and true complexity of operational warfare, it does distinguish between operational, strategic and tactical tasks. In its pages, the following operational requirements and tasks may be found (by direction or inference):⁸⁰

1. Operational art involves fundamental decisions about when and where to fight and whether to accept or decline battle.
2. Its essence is identification of the enemy's operational center of gravity (defined as his source of strength and balance) and concentration of superior combat power to achieve decisive success.
3. Operational commanders must plan and direct campaigns.

4. It requires broad vision, ability to anticipate, careful understanding of relationship of means to ends, and effective joint/combined cooperation.
5. In essence, it requires the commander to determine:
 - a. the military conditions in the theater which will achieve the strategic goal.
 - b. the sequence of actions most likely to produce that condition.
 - c. the best application of available resources to accomplish that sequence.

I have highlighted those specific operational tasks which require time estimation for successful completion. Greater specificity is available in a subsequent chapter on "Operational and Tactical Planning and Execution." Here, the tasks of the operational commander are expanded (see APPENDIX).⁸¹ As the level of specificity of tasks increases, the requirements for time estimation appear to increase commensurately. Yet, while it is clear that doctrine directs many specific operational tasks requiring command decisions, the operational artist will not find much useful advice on tools, techniques and procedures applicable at the operational level to aid him in fulfilling these multi-dimensional responsibilities. He will find the acknowledgement that:

The conduct of battles differs from that of campaigns and major operations in some important respects. Speed of response, ability to change direction, and sensitivity to short-term events are among these differences.[emphasis added]⁸²

These doctrinally-recognized differences between tactical and operational requirements all revolve around the element of time. Doctrine identifies the central difference between the levels of war, but fails to tell the operational commander what to do about it. While it would not be appropriate for doctrine to dictate technique, it should at least describe the ways these operational differences can be resolved. The one recommendation in the doctrine targeted at operational commanders is to "use the estimate of the situation and planning process described in FM 101-5."⁸³ Even that lone recommendation is cautiously (and appropriately) caveated with the recognition that at the operational level of war where joint and combined operations are the norm, Army processes may not be appropriate or adequate.⁸⁴ This is a critical dilemma for the operational commander. Without experience at the operational level of war he is most likely to try to use the tools of his upbringing - those tools applicable to tactical operations. They are likely to be wholly inadequate to the multi-dimensional requirements identified above.

CHAPTER 3

HISTORICAL FAILURES IN TIME ESTIMATION

The literature search has been frustrating for lack of indisputable evidence that command failure to estimate time requirements at the operational level ever lost a campaign or a war. There are, however, many examples of strategic and operational failure which hint at time estimation as a contributing factor. From the broad choices available to illuminate operational level time considerations, I have selected Napoleon's 1812 Campaign and General Gamelin's tragic defense of France in 1940. These campaigns are representative of the larger body of evidence which suggests that a connection does exist between time estimation and success at the operational level. And while it would be a gross oversimplification (and a serious misuse of history) to tag either of these defeats to any single cause, both illustrate the role of time estimation as a critical basis for planning and executing campaigns. Admittedly, the central problem is establishing cause and effect. As Maurice Matloff warned:

...cause and effect in human relationships cannot be exactly established. It is not possible to discover all the factors bearing on any event in human history...⁸⁵

Time estimation is not a discrete activity which can be separated from the host of other operational tasks or presented as singularly causative of failure. It is but one component of the whole command and staff estimate process embedded in a nation's military command and control structure. The distinctions Martin Van Creveld makes in Command In War are useful to this analysis. While the basic functions of command have not changed since the Stone Age, the means by which command is exercised have undergone a long and continuous development.⁸⁶ He classifies these means as: (1) organizations; (2) procedures; and (3) technical means. This framework makes it possible to describe the structure of any command and control system at any time and place; it will be used as a point of departure for examining the historical examples mentioned above.

SECTION 1: NAPOLEON 1812

...with such resources we shall devour all distances.
Napoleon prior to Russian Campaign⁸⁷

Napoleon is included in this study for two reasons. First, to many, he represents the first commander to operate on the fringes of operational art.⁸⁸ Depending on the specific campaign considered, Napoleonic Warfare variously ushered in evolutionary or revolutionary changes, or both. Certainly, its unique concept of moving large, independent corps on different axis of advance to combine and fight a decisive battle marked the first time in history that armies did not move to battle and fight as singular entities.⁸⁹ Second, Napoleon epitomizes the highly individualistic approach to command and control (with its reliance on individual genius) that I believe retains wide credibility among operational commanders today. He is worthy of study for that reason alone.

Van Creveld has described Napoleon as "the most competent human being who ever lived."⁹⁰ While that might be argued, the facts show that in 1805, he was personally commanding an army of 250,000 articulated into eight deployed corps, each with its own dedicated staff.⁹¹ By all accounts Napoleon was a complete master of his profession capable of personally conducting every activity connected with war. The command system he created was unique - tailor made to suit the workings of his individual genius. To harness the raw materiel of manpower and equipment that was his inheritance from the French Revolution, he molded an Imperial Staff to relieve him of all tasks not requiring his direct personal attention. This staff consisted of the commander, and from 1805 on, at least three other independent parts: the Household or "Maison" (basically a personal services staff), the General Staff of the Grand Army, and the General Commissary of Army Stores (or Administrative Headquarters). According to Professor David G. Chandler's authoritative The Campaigns of Napoleon, the Maison (and within that, the Cabinet termed the "sanctuary of genius") was the true nerve center of the French headquarters.⁹² The Emperor's Cabinet consisted of a Secretariat (secretaries, librarians, and archivists), a Statistical Bureau (which provided long-range strategic intelligence), and a Topographical Bureau (the central nerve center of the "sanctuary of genius")⁹³, all of which furnished the technical means by which Napoleon conducted his unique form of war.

Unlike the command-staff arrangements of post-Napoleonic staffs, Napoleon reserved a number of critical positions which were central to his method of command. He was his own Commander in Chief, his own Chief of Staff, his own Chief Estimator, and his Army's central information processor.⁹⁴ Napoleon augmented his normal reporting channels through an innovative system of Adjutant Generals, officers hand selected to perform an array of command directed missions including "leading a charge, negotiating a treaty or cooking

a chicken."⁹⁵ These "directed telescopes" provided Napoleon tremendous flexibility to indirectly influence actions, but they were no substitute for his personal presence. Berthier, his appointed Chief of Staff, was relegated to dispatching orders, maintaining the war diary, following the developing situation in battle, posting results on maps, maintaining reports and registers, and conducting inspections.⁹⁶

The key to understanding the functioning of Napoleon's headquarters is to recognize its near-total reliance on the genius of the commander.⁹⁷ He was its motor, its brain, and its power supply. He habitually worked 18 hours a day on campaign, and in fact, could forego sleep for days at a time. His professional competence was empowered by unmatched gifts of memory and calculation. His mind was a masterful tool, able to assess huge volumes of information, distill important facts, and use them for estimation, projection, and prediction. In this regard, he was without equal, a fact which allowed him the luxury of always thinking (and acting) a step ahead of his opponents.

To aid his command estimate process during campaign planning, Napoleon relied on large situation maps and colored pins arrayed to display order of battle information. Nearby, were dispatch boxes, a field desk, a pair of dividers preset for a day's marching distance, and Napoleon's personal field library of "carnets" containing details of each friendly and enemy unit to regimental level.⁹⁸ He was assisted in this process by Bacler d'Albe, head of the Topographical Office from 1796-1813.⁹⁹ Chandler contends that Napoleon would entrust d'Albe with "important calculations of time and distance."¹⁰⁰ That said, the greatest tool brought to the operational planning tables within the Maison was clearly the mind and will of this unique commander. In those secret chambers the countless calculations of time, space, and force were executed and decisions made. Yet, as so eloquently stated by Professor Chandler:

In this rigid centralization of power into a single person lay at once the strength and weakness of the Household, of the entire staff organization, of the French Empire itself.¹⁰¹

It is not the intent of this study to recount the details of the 1812 Campaign in Russia, but rather, to focus on the initial phase because of the critical importance of Napoleon's initial time-space-force calculations to the remainder.¹⁰² This was no hastily planned operation. Of all Napoleon's campaigns, the human and material resources assembled for the invasion of Russia were unparalleled in the history of warfare, "out of all proportion to

anything that went before."¹⁰³ To frame his estimates, Napoleon gathered and read every available book on Eastern Europe.¹⁰⁴ He obtained and memorized the details of every available map. He carefully studied histories of Charles XII's failed 1709 Campaign. He calculated a required strength of nearly 500,000 men. He was acutely aware of the poor conditions his armies would face in Russia, and he prepared in accordance with his personal estimates. Recognizing the logistics requirements for such a force over such a distance, he returned to the 18th Century support system of depots, magazines, and cumbersome support convoys.¹⁰⁵ As Napoleon described the extent of his efforts to Davout: "I have never made greater preparations."¹⁰⁶

On 22 June 1812, after months of such meticulous planning and preparation involving the massive strategic concentration of approximately 600,000 troops along the Russian border, French reconnaissance across the Nieman River began.¹⁰⁷ Napoleon's Grande Armée de la Russie was organized into three lines. The first line consisted of a group of three armies, some 449,000 soldiers to spearhead the invasion, with Napoleon personally commanding the principal army of almost 125,000.¹⁰⁸ As flank and rear guards for this spearhead, Napoleon formed two auxiliary armies and two semi-autonomous corps of largely allied composition. The two auxiliary armies were commanded by Napoleon's stepson Eugene de Beauharnais (80,000 Italians and Bavarians) and by his brother, King Jerome (70,000 Westphalians, Saxons, Hessians, and Poles). The flanks of these two armies were to be guarded by Macdonald's Xth Corps on the left and Prince Schwartzberg's Austrian Corps on the right. Napoleon's second line consisted of 165,000 men intended as replacements. His reserves consisted of Victor's IX Corps, part of XI Corps, and a conglomeration of Polish, Lithuanian, and German troops. Finally, the third line consisted of an additional reserve of 60,000 soldiers.

The theater of operations consisted of a northern and a southern front divided by the Pripyet Marshes. Napoleon calculated the advantages and disadvantages of each before selecting the northern sector as most flexible and advantageous for his main offensive effort.¹⁰⁹ Additionally, he had a fairly accurate picture of the Russian order of battle, recognizing that Barclay de Tolly's First Russian Army was arrayed in the north with about 127,000 men, and that Bagration's Second Army of 48,000 soldiers was massed around Lutsk. He chose Barclay's Army as his first objective. Napoleon's plan was brilliant:

The march of my army will be a movement which I shall execute with my left wing while continually refusing my right wing.¹¹⁰

Napoleon intended to mass the Grand Army around Kovno followed by a drive to Vilna to effect a strategic penetration, dividing Barclay's over-extended army while severing the larger portion's LOCs to St. Petersburg. The plan hinged on two critical aspects: (1) Vilna had to be occupied before the Russians could react; (2) the massed Russian forces would have to be baited into the proposed killing zone south of Grodno. Therefore, Jerome and Schwarzenberg were to occupy Bagration's forces with strong frontal pressure while the spearhead advanced to Vilna. Then, Jerome was to conduct a deliberate withdrawal up the Narew River to effect a link-up with Eugene and Davout, pulling the Russians with him and trapping them in the Grodno-Slonim pocket.¹¹¹ By Napoleon's personal time-space-force calculations, the campaign would last 20 days, by which time his army would stand completely victorious over the Russians.¹¹² His preparations were made according to that estimate.¹¹³

The initial concentration, itself a monumental undertaking, went fairly smoothly as did the initial movement to contact.¹¹⁴ Kovno was occupied without a fight on the 24th and 25th. As Napoleon's advanced elements failed to make contact with Barclay, it became apparent that he (Barclay) was withdrawing to the stronger position at the Dvina rather than standing to fight. Yet, Napoleon's campaign plan had been based on the notion that battle would be accepted.¹¹⁵ Given the changed circumstances, Napoleon and Eugene could still attempt to penetrate the divided Russian forces and trap Bagration in the south. Bagration consequently became the new target.

Under this new plan, Jerome's role remained pivotal - he had to maintain strong enough frontal pressure to fix Bagration's force and prevent it from escaping to the east. Furthermore, Napoleon's right flank army under Eugene was two days behind schedule, and this revision required Eugene to be in Kovno to protect Napoleon's LOCs over the Nieman River. This delay was largely the result of the awkward transport convoys made necessary by the force-time-space dimensions of the campaign. Yet while the convoys were essential, no accurate estimate of how their unwieldiness was to delay the operation had been made.¹¹⁶ Furthermore, the weather now began to affect operations. The troops suffered under the intense heat during this early phase of the operation, and clouds of thick dust enveloped the advancing forces. In late June, heavy rains slowed the columns and turned their roads into mud. The change brought sickness and death to men and their horses.¹¹⁷ At the same time, regular distribution of food stopped and each soldier was forced to "take wherever he can find it, and live as well or as badly as he can manage it."¹¹⁸ This was hardly encouraging to the numerous allies who

were less inclined to blind loyalty to Napoleon; discipline became a major problem in many units.¹¹⁹

Undaunted, Napoleon continued to work to trap Bagration.¹²⁰ He occupied Vilna without a fight, and reasoned that if Jerome and Eugene kept up the frontal pressure on Bagration, Davout could move south and intercept him. The combined French armies of 110,000 would crush the Russian army of 45,000. But two serious problems occurred in the execution: (1) Eugene did not move to Vilna as ordered on 1 July due to rumors of a large pending Russian attack on his flank; and (2) when Eugene finally occupied Vilna on 3 July and Davout was ordered to begin the attack, Napoleon discovered to his horror that Jerome had not put any pressure on Bagration and that he had waited 48 critical hours to notify anyone about it.¹²¹ Bagration, of course, recognized the unfolding trap, and wasted no time in escaping to the southeast toward Bobruisk. Thus, by July 8th, as Davout's pursuing soldiers entered Minsk and discovered that Bagration had made good his escape, Napoleon was forced to admit that his plan had failed.

It would prove extremely difficult for Napoleon to overcome this initial failure as the interactions of force, time, and space continued to drain his strength. His initial calculations had identified the initial phase of the campaign as critical. Resources had been calculated on the assumption that a decisive battle would be fought within a month of crossing the Nieman River.¹²² Negotiations were to follow, and the army would recover in the resulting pause. By the end of the first month Napoleon knew that his estimates were wrong. The loss of this first opportunity robbed him of a much needed success. Moreover, it portended darker indications of Russian capabilities for eluding battle by withdrawing ever deeper into the vast interior spaces. Denied the decisive battle he sought, Napoleon would only continue to expend his forces in tactical battles and further extend his already tenuous LOCs as the campaign continued.

By the beginning of August, over 300 miles inside Russia, he had yet to find a way to exploit tactical victories.¹²³ At Smolensk in late August, continued tactical actions had reduced the strength of the main French Army to about 145,000, although this ignores the numerous other forces dispersed on the flanks and rear. Over the next 28 days, the Grand Army covered 280 miles between Smolensk and Moscow, fighting the Battle of Borodino on 6 September. Napoleon was again denied the strategic victory he sought, and his main army was reduced to less than 100,000 effectives against Kutusov's remaining strength of about 55,000. Two weeks later, Napoleon entered Moscow with about 95,000 soldiers. Kutusov evacuated Moscow, leaving Napoleon with

nothing but a hollow shell of victory for an army near culmination. The torching of the city denied that Army a much needed base for reconstitution. Emperor Alexander refused to accede to Napoleon's peace demands, and on 17 October, Napoleon decided to retreat.

The retreat from Moscow brought total ruination to the Grand Army.¹²⁴ Between November 9th and 13th, a little over 41,000 of the 95,000 which had left Moscow reached Smolensk. At the Berezina River, 25-29 November 1812, Napoleon's forces united with Oudinot's and Victor's forces raising his overall strength from approximately 25,000 to 49,000. Of these, approximately 20,000-30,000 became casualties during the crossing operations. Between the towns of Smorgoni and Vilna, another 20,000 men dropped, largely due to the severe effects of winter. By 10 December, only 7,000 troops effectives remained. On 6 March 1813, the Russian Campaign came to an end. Results were staggering:

The limits of French hegemony had almost been returned to the boundaries of 1806; half a million men and six years of effort, achievement and sacrifice had been thrown away in the misfortunes of a single campaign.¹²⁵

While it would be inaccurate to claim that the initial failure to trap Barclay or Bagration caused the failure of the entire campaign, a strong argument can be made that it was a primary contributing factor. At its root, Napoleon's initial failure seems to be related to his erroneous perceptions of time, force, and space. His calculations were wrong because the organizations, procedures, and technical means on which they were based belonged to a different kind of war than the one attempted here. We have already established the unequalled force size. This army was three times the size of the force that Napoleon had commanded in previous campaigns.¹²⁶ One source states that "compared with the rapier-like force of 1805-1807, it was a bludgeon."¹²⁷ It was difficult to mass such a sizable force, and it required revolutionary methods to sustain it over time and space. Those methods were not yet available to any army.¹²⁸ Chandler contends that the single greatest reason for Napoleon's defeat was the unsurmountable logistical problem. His staff grossly miscalculated the traffic capacity of the Polish and Russian roads; as a consequence, every convoy was late by weeks and even months, the local grain and fodder resources of Russia were overestimated, and the speed at which the vast heard of cattle could move was incorrectly assessed.¹²⁹

Similarly, Van Creveld reflects in *Logistics In War* that "the worst shortages were experienced during the first two weeks of the advance (i.e. precisely the period for which Napoleon had made his most careful and

extensive preparations)..."¹³⁰ He asserts that the technical means of the day simply made it impossible for Napoleon to feed his men and horses from a logistics base. We have already examined Napoleon's answer to this dilemma. He could not reduce the size of the force and existing sustainment means were inadequate; consequently, he reverted to trains and depots. This, in turn, drove Napoleon to develop a campaign which relied on rapid victory to mitigate the limitations of his logistics system. Time was of the essence, and Napoleon depended upon the effective execution of his plan by his subordinates. Because they failed him at critical moments in the initial phase of the operation, Napoleon entered Vitebsk without achieving his objective. Significantly, Vitebsk marked the farthest point where his extended logistics system could hope to support the force.¹³¹ Napoleon's time-space-force calculations did not prove adequate to the requirements of this campaign.

Napoleon encountered serious problems commanding and controlling this extraordinarily unwieldy force. Commanding an army of 600,000 was a qualitative and quantitative step removed from commanding an army of 200,000. The fact that almost one half of the Grand Army infantry and one third of the cavalry were foreign introduced new variables to the equation of war.¹³² Yet Napoleon approached this campaign as he had all others. He refused to allow Berthier to function as a true Chief of Staff, thereby reducing his effective span of control at precisely the time when he could not afford it. He retained centralized control when his success ultimately depended on the decentralized, independent and timely actions of his immediate subordinates. The Grand Army that invaded Russia demanded a new level of control decentralized at army group level to operate effectively in this theater. Of course, that level did not yet exist; if it had, it is far from certain that Napoleon would have used it. Yet without this intermediate level of command, the success of the campaign would necessarily rest upon two dependent conditions: (1) the quality of subordinate leadership; and (2) the quality of Napoleon's command over those subordinates and control over their actions. There were failures in both areas.

Napoleon was poorly served by his army commanders - that is clear from the incidents related above. But their failure was at least partly due to his own selection process and his decision to lead from Vilna where he was largely unable to influence his subordinates or correct their errors.¹³³ In previous campaigns Napoleon exercised centralized control by direct personal observation from the critical front - in this campaign he exercised command from his headquarters. He was therefore unable to direct the critical operations between Davout and Jerome to seal the fate of Bagration's Army on 1 July

1812. As he led from Vilna, his subordinates failed him and Bagration escaped the trap.¹³⁴ Given the fact that his plan hinged so heavily on these requirements, Napoleon must ultimately bear the brunt of the blame for applying inadequate tools to a changed type of war that he had created.

While these represent but a few of the aspects of warfare in this campaign, they illustrate the point that Napoleon's brilliant strategic plans could be rendered irrelevant when the organizations, processes, and technical means of war were not sufficiently adapted to the changed nature of warfare, even though he was responsible for that altered state. Without those means, Napoleon's calculations of time, space, and force were bound to be in error. As Chandler states:

Indeed, the scale of war which he now contemplated was really beyond even the Emperor's phenomenal capacity.¹³⁵

....The problems of time and distance were to prove too great for the capacity of a single mortal, even when that man was Napoleon.¹³⁶

The age of operational warfare had truly begun, and Napoleon was perhaps its first unwitting victim.

SECTION 2: THE FRENCH DEFEAT IN 1940

It was *time* that was the vital element which - more than weapons, even perhaps more than morale - France most lacked in 1940.¹³⁷

In essence, this section concerns the antithesis of the Napoleonic or "heroic" failure. It portrays most poignantly the ultimate cost to modern nations who fail to recognize or adapt to the changed dimensions of the time-space-force equation of war. In May of 1940, there were two calculations made, one by each opposing force. As it turned out, both were wrong. Perhaps no other example in history presents such vivid contrasts of successful and unsuccessful adaptation to change. To one side, the error brought greater success than expected. Due to flexible staff organization, unique command and control structures, and enhanced technical means, the success was exploited and the result was the forced evacuation of an entire Allied Army at Dunkirk and the conquest of Europe. For the other side, the error cost a nation its sovereignty, its dignity, and some would say, its very soul.

As with the previous vignette, this section does not focus on the tactical action.¹³⁸ By the outbreak of hostilities, the French had mustered 67 divisions

supported by an additional first contingent of five British divisions to oppose the expected invasion.¹³⁹ The Allies had over 2600 tanks to the Germans 2400, but any disadvantage the Germans might have had in raw numbers was mitigated by employment in mass rather than distributed in pennypackets across the front as the French preferred. In terms of airpower, the Allies were at a decided disadvantage with their 2000 aircraft opposing 3700 German combat aircraft. Perhaps the greatest disparity between the forces was in terms of morale. There the Germans enjoyed a decided advantage. The effects would soon be evident.

On 10 May 1940, the poised German forces of Army Group "B" launched a supporting attack with 30 divisions through Holland and Belgium while the German main attack occurred through the Ardennes with 45 divisions of Army Group "A."¹⁴⁰ By 14 May, the first nation - Holland - fell to the Germans. On the 15th, the Germans had reached the Dyle Line in Belgium where the major Allied strength had been massed in anticipation of a main attack in the north. On 12 May, the first elements of Army Group "A" arrived at the Meuse River after encountering meager French resistance in the Ardennes Forest approaches. On 13 May, the Germans forced crossings at Houx, Montherme, and Sedan. By the 15th, the German bridgehead was 62 miles wide. The same day Guderian split the seam between the French Second and Ninth Armies and exploited it toward the west. On the 19th, General Weygand, Commander-in-Chief of the French Army relieved General Gamelin, Supreme Commander of French Ground Forces. By 20 May, the Germans had gained a tenuous toehold to the sea at Abbeville. On 28 May, King Leopold of Belgium surrendered unconditionally. The remnants of the Allied force gathered in a small perimeter surrounding Dunkirk where they were able to evacuate 338,226 troops before the Germans closed on the pocket on 5 June. That evacuation was possible only because Hitler inexplicably ordered a halt to the German advance - had the order not been given, it is likely the entire Allied Army would have been destroyed. The follow-on Battle of France began that same day with approximately 65 French divisions facing over 140 German divisions. The French forces were simply overwhelmed by the sheer weight of the force, and France surrendered unconditionally on 22 June. Although the Campaign in the West had lasted six weeks, the French Army was essentially broken in the first week. This was the fate of an Army that had been widely esteemed as the most formidable fighting force in Europe.¹⁴¹

The failure did not occur simply because the French Army had not adjusted to the changed conditions of warfare. It was the utter failure of the French nation to recognize and adapt to the realities of the new world order,

and within that order, a changed equation of war and a changed dimension of time. France was lost in a time warp created by the First World War, but sustained by her own volition through pride and arrogance.¹⁴² She had buried an entire generation in the trenches in places whose names still evoke pity and dread - places like Ypres, Verdun, the Somme.¹⁴³ War was too horrible and expensive for society to bear; there would not, there could not, be another war.¹⁴⁴ For an entire nation, the art of the possible became bounded by the limits of the desired - perhaps the most dangerous of all forms of wishful thinking. The operational failures that followed can only be understood in the context of the strategic failures which encompassed them.

The French military was nothing but a mirror of the society from which it drew its resources. By 1940, that army had become a hollow shell of the force that had foiled German aggression at the Marne in 1914.¹⁴⁵ Between the wars, France was engulfed with a "malaise militaire" - strong anti-war sentiments crept into virtually every element of national power. Its effects penetrated to the very roots of the military, its forces, organization, command structure, equipment, and not the least, doctrine. The nation had paid a heavy price between 1914-1918, and had gained little in return. Pre-World War I problems were only intensified as the root causes of the next war were sown at Versailles. The result was widespread disillusionment, apathy, and spiritual exhaustion of a nation and her people. Ultimately, cumulative effects became manifest in her defense posture. World War I had taught France the totality of war and the value of the citizen soldier. In the post-war challenge, however, anti-military sentiments won out as the term of the reservist was reduced to a meager 12 months while the nation's reliance on his abilities grew disproportionately. Military issues became increasingly dominated by domestic politics. Decisions that represented compromise in the form of the least common denominator became the only workable solutions. Compromise was the only aim, group consensus the only means. In such an environment, command at the strategic and operational level had little relevance.

As the international horizon clouded, the professional military took refuge in its "successes" of 1918.¹⁴⁶ If it became necessary, She would pick up the next war with the conditions which had won the last one. Painful memories of the high price of an irrational offensive doctrine used at the outset of World War I led to wholesale adoption of defensive strategies, equipment, doctrines, attitudes, and ultimately, on an equally irrational reliance on wishful thinking as a tool for estimation. The military motto was "Lavish with steel; stingy with blood."¹⁴⁷ Fortifications were cheaper to the nation than manpower, thus the Maginot Line represented as much a state of mind as a state of defense.

Given time and money, it would assume almost magical proportions as an impregnable southern shield flanked by the "impenetrable" Ardennes Forest in the middle sector and a mobile force in the north.¹⁴⁸

Along with the new defensive orientation, new organizations were established which fragmented the military's peacetime and wartime chains of command and diffused their authority to intolerable levels.¹⁴⁹ The Chief of the General Staff of National Defense had no Joint General Staff to coordinate multi-service support; rather, all military direction was to come from a war committee to be organized in time of war. Yet, in addition to overall responsibility for national military strategy, Gamelin had also been responsible for direct command over the Zone of the Armies of the North-East (all French ground forces on the front) until he reassigned that duty to General Georges in January 1940.¹⁵⁰ While being denied a means for effecting joint coordination, Gamelin was ultimately at the mercy of decisions by political committees and councils. The entire French chain of command was diffused and amorphous.¹⁵¹ In such an environment, distinguishing among strategic, operational, and tactical failures is difficult if not impossible - they are all interrelated. In fact, a case can be made that in 1940, France lacked command at any level above the tactical - that even such strategic/operational level commanders as Gamelin only exercised tactical command, that strategic and operational command were committee responsibilities not exercised at all. While that may be an extended argument, it is nonetheless clear that the French command organization was wholly inadequate to the pace of decisionmaking required by mobile warfare at every level of war. But the French had no intention of conducting mobile warfare, and the pace of 1918 suited the public, the government, and the Army quite well until May 1940.

Review of Alistair Horne's To Lose A Battle - France 1940 and Marc Bloch's Strange Defeat reveals a consistent thread of events which confirm the distorted perceptions of time involving German actions on the front and French reactions at many levels. The following sections recount but a few of the most serious. While many appear focused at the strategic/operational level, this study asserts that no French military commander actually conducted operational art - the command structure rendered it impossible. Nonetheless, all of the failures in time estimation presented in the following sections confirm the wholesale inability of the French military to effectively calculate the equation of war at the strategic, operational, or tactical level.

For our first example, we turn to the technical means of command and control. In spite of evidence that other nations were changing the means of command and control to harness the capabilities of the radio, France remained

tied to the telephone.¹⁵² This flew in the face of the lessons of World War I where loss of telephone communications to artillery barrages sorely affected command and control, but it fairly reflected the conservatism which met most suggestions for change. A free warning of the altered dimensions of armored mobile war supported by air assets was offered during the 1939 Polish Campaign, but the French spurned the lessons of the Blitzkrieg. It was not due to ignorance of the situation. A French Air Force General Armengaud had observed the action in Poland and delivered a detailed report on the campaign to Gamelin in 1939.¹⁵³ Horne describes the French attitude toward the lessons as: "We are not Poles, it could not happen here."¹⁵⁴ This was no unfortunate blindness to an altered state - it was "studied and arrogant disregard" by the French High Command.¹⁵⁵

During the long "Phony War" months of the winter of 1939-1940, the French military would again reflect their arrogance for reality by another curious means - idleness. Rather than using the breathing room to remedy problems in organization and training, the French absorbed themselves with "blancoing the kerbs and steps of their barracks, playing organized football, growing roses to embellish the glacis of the Maginot forts, and...tilling the fields" to counter boredom.¹⁵⁶ This contrasts markedly with Germans who used the time to transform second, third, and fourth line divisions into combat ready units.¹⁵⁷ In spite of the severity of the harsh winter weather, the German Army High Command conducted intensive training in mobile operations.¹⁵⁸ Divisions were organized, equipped, and trained. Lessons of the Polish Campaign pumped into the front line units during this period were to be ably demonstrated in a few short months.

The key operational (and strategic and tactical) shortfalls resulting from French errors in time estimation center on evidence that critical French attempts to counterattack were always too late with too little.¹⁵⁹ Time and again operational commanders demonstrated that they were basing their calculations on their own capabilities and desires rather than on demonstrated German capabilities. Yet, the only opportunities the French had to seize the initiative from the Germans rested squarely on successful counterattacks launched at the precise time when the Germans were most vulnerable. As Bloch recounts, "From the beginning to the end of the war, the metronome at headquarters was always set at too slow a beat."¹⁶⁰ The French General Staff, for example, on 12 May estimated that because its forces could not execute a full-scale crossing of the Meuse before 18 May, neither could the Germans.¹⁶¹ This is an example of operational decisions with both strategic and operational implications. Horne describes the manner in which General Huntziger brought

the reserve 71st division into the line of the Second Army in the critical Sedan sector as symptomatic of this "fatal leisureliness." On the 10th, the division was 60 miles away. The X Corps commander who owned the 71st deemed it impossible to march the distance in 2 days.¹⁶² As Horne correctly points out, this was another case of:

thinking in 1914-1918 terms; it need hardly be remarked that the German infantry divisions of 1940 would not have found such a march beyond their powers, even on foot."¹⁶³

A perfect contrast to this mental straitjacket which gripped the French High Command is indicated by General Guderian's comments regarding preparations for the critical Meuse crossing operation on 13 May:

In view of the very short time at our disposal, we were forced to take the orders used in the war games at Koblenz from our files and, after changing the dates and times, issue these as the orders for the attack. They were perfectly fitted to the reality of the situation. The only change that had to be made was that at Koblenz we had imagined the attack going in at 0900 instead of 1500 hours.¹⁶⁴

This too is a reflection of an operational level commander whose decisions and actions veiled strategic significance. It also reflects armies, commanders, and nations at opposite ends of a time warp - the French lost in the static trenches of a past war where time was measured in months and years, and the Germans straining for a future war of mobility where time measured in mere hours could seal the fate of nations.

The contrast continued throughout the fateful days of May 1940. Not a single of the key French military leaders at any level had the slightest notion of how fast the German panzers would exploit the penetration of the French resistance at the Meuse.¹⁶⁵ Yet, clearly, such a calculation would prove essential to timing any French counteraction to deny the German's the coast. It would be negligent to talk about the French failures in time estimation and not include the significant role played by their unique penchant for optimistic reporting which clouded their situational awareness. The penetration which was to unhinge the French nation was reported by General Georges to General Gamelin as 'un pépin assez sérieux' ('a rather serious pin-prick') at Sedan.¹⁶⁶ It is hardly surprising that Gamelin's estimates and responses would often miss the mark. Bloch paints a more damning picture:

...the fact that we were never quite certain of his movements was due mainly to a persistent failure ever to judge

distances correctly. Our own rate of progress was too slow and our minds too inelastic for us ever to admit the possibility that the enemy might move with the speed which he actually achieved.¹⁶⁷

Returning to the crossings at Sedan, we encounter another incredible incident of French time estimation at the operational level gone awry. On 13 May, the day the Germans forced the crossing, General Grandsard, X Corps commander, enjoyed a commanding view of Guderian's forces from the imposing French defenses on the heights of La Marfée.¹⁶⁸ At least 200 German tanks were identified in the St. Menges area, with another 200 located in Sedan. But the French artillery was left to fire only 30 rounds per tube that day. The reason, according to Grandsard, was to conserve ammunition! That ammunition he conserved would fall into German hands within hours. Grandsard had calculated on 13 May that the enemy would be unable to do anything for four to six days because it would take that long to bring up heavy artillery and ammunition and to position them.¹⁶⁹ But throughout the campaign the Germans would demonstrate an embarrassing talent for showing up on the battlefield at unanticipated times and places.¹⁷⁰ Grandsard's calculation was based on how long it would take the French to bring up their heavy artillery, but Guderian did not play by French rules. His artillery would come from the skies:

...it is typical of the unreal world in which the French commanders existed that...Grandsard should not have been capable of envisaging that the Luftwaffe would play in a Meuse crossing.¹⁷¹

The Germans were not restricted to roads, but operated everywhere. They sought, found, and exploited weak spots in the French defense. They used these small tactical victories as the basis for follow on actions which had already been flexibly planned for. Their methods were action and improvisation in contrast to French lethargy and inaction.¹⁷²

In continuing contrast to the Germans, the French air effort suffered from the same maladies which afflicted the ground forces. Liaison linkages were inept between ground and air units, and in spite of the identification of large masses of tanks at critical river crossing sites, the Allies were unable to do much damage. It is of interest to note that General d'Astier, Air Commander in the North Zone of Operations claims that on May 13th, although he was requested to shift priority of effort to Second Army, he was not informed of the severity of the situation.¹⁷³ He was simply told that a crossing was expected in the next "three or four days." Also contributing to the poor

Allied Air Force showing was their inability to support ground units in the same areas where artillery was being fired.¹⁷⁴ This stands in marked contrast to the flexible and effective techniques used by the Luftwaffe to support Guderian's crossing that same day.

But high speed operations required specialized equipment, equipment which the Germans had and the French did not. They were short in tanks, aircraft, artillery, vehicles, and tractors - the French had poured their national treasury into the Maginot line to the tune of over 7 billion Francs by 1935¹⁷⁵ - and concrete was the tool of this preferred notion of war.¹⁷⁶ In contrast, the Germans used aviation to compress time on the battlefield at the operational and strategic levels, and employed other German weapons to achieve similar effects. The German '88,' especially in its ability to destroy French fortifications formerly considered impervious with direct high velocity fire, proved a formidable combat multiplier and gained much time for the Germans at Sedan.¹⁷⁷ So it was with their use of the radio and any other technical means they could use to time's advantage in mobile warfare. The effectiveness of their efforts at time compression is accurately reflected in Horne's assessment:

At Sedan, events move with such brutal speed that the historian is left floundering...Unlike the leisurely four months of siege warfare around Paris in 1870, or the ten months of static warfare at Verdun in 1916,...the decisive acts at Sedan pass in confused, unchronicled minutes, or even seconds...¹⁷⁸

Bloch further recounts the severe psychological shock and resulting mental paralysis as a "mood of outraged amazement which laid hold of men who were faced by a rhythm of events entirely different from the kind of thing they had been led to expect."¹⁷⁹

In this new type of war, time estimation became even more significant than before as the increased tempo of strategic, operational, and tactical actions compressed decisionmaking cycles. The repeated French failures to identify and exploit German operational weaknesses led to strategic failure and ultimately capitulation. Both types of failure resulted from inaccurate French command estimation of time. The organizations, procedures, and technical means used by the Germans ushered in an age of mobile warfare that was quantitatively and qualitatively advanced from the static warfare the French embraced. French organizations, procedures, and technical means were relics of a bygone age - they were both inappropriate and inadequate. As Napoleon found on the ashes of Moscow, campaigns and wars are not won by wishful

thinking built upon false assumptions. They are won when the tools of the trade match the requirements of the job. That harmony is essential. As the nature of warfare changed through the ages, successful armies evolved proper tools to fit the need. Unsuccessful armies are those who have either failed to recognize the altered dimensions of the time-space-force equation of war, or have otherwise chosen to apply obsolete tools to resolve it. In any case, mismatch can only bring ruin. As Bloch reflected:

What drove our armies to disaster was the cumulative effect of a great number of different mistakes. One glaring characteristic is, however, common to all of them. Our leaders...were incapable of thinking in terms of a *new* war the German triumph was...a triumph of intellect - and that is what makes it so peculiarly serious.¹⁸⁰

The lesson in all this seems clear. The operational artist requires a unique set of organizations, procedures, and technical means to plan and conduct operational level war. Time, space, and force considerations at this level are a generation removed from those of the tactical commander and several dimensions removed from the classical strategist of Clausewitz's era. The basic tools of the trade that have been developed for time, space, and force considerations at the tactical level are inadequate at the operational level. Failure to recognize these requirements can translate into operational and strategic failure on the battlefield.

CHAPTER 4

CONCLUSIONS AND RECOMMENDATIONS

SECTION 1: CONCLUSIONS

This study began with a review of theory to identify the distinguishing characteristics of operational art compared to classical strategy. It established the single dimension focus of classical warfare as quantitatively and qualitatively removed from the multi-dimensional considerations of operational art, and introduced the equation of war (time-space-force) as the central concern of commanders at all levels. From there, the study examined approved doctrine to identify specific operational tasks requiring time estimation (see APPENDIX). This surfaced the concern that while operational level command tasks differ significantly from tactical level tasks, there is little doctrinal guidance to aid the operational commander in meeting those requirements. The next chapter presented two historical case studies which examined the relationship between the means used by two operational level commanders to calculate time-space-force requirements and the nature of conflict being fought. It also identified potential results when those means were inadequate or inappropriate to the type or level of conflict being fought.

While every effort has been made to avoid overreaching generalizations in this study, some conclusions emerge. The most basic of these is that the nature of war appears to change in both evolutionary and revolutionary ways. Change in warfare has been, and is likely to be, the inevitable result of changes in society. As societal changes occur, the equation of war may change as well, and fundamentally different requirements (command tasks) emerge. These requirements inevitably relate to the commander's calculation of time, force, and space to achieve strategic goals. Because these elements are interactive, a change in any of them alters the whole equation.

To calculate the equation of war, commanders make use of organizations, processes, and technical means. This fully describes the resources at their disposal. On the basis of the theoretical and historical evidence considered, this study concludes that if the commander's means for calculating the equation of war are inadequate or inappropriate to the nature, or level, of the conflict being fought, he is likely to suffer defeat. This is not offered as proof; results in war will always be influenced by Clausewitz's fog and friction which give chance its due. Thus, while miscalculation is unlikely to lead to success, it does not guarantee failure. However, because the operational commander's ultimate goal is to conduct successful campaigns and operations, he

must harmonize time-force-space calculations with the nature, and level, of the conflict being fought. That is not possible if the tools of the trade - the organizations, processes, and technical means - belong to a different type or level of conflict.

This study asserts that tactical tools designed to solve tactical time-space-force problems are inappropriate and inadequate for the multi-dimensional requirements of operational art. This is especially true with regard to synchronizing simultaneous and sequential operations with discrete air-land-sea-space forces to achieve synergistic effects. While that even sounds complicated, it is simply a translation of the principles of mass and economy of force at the operational level. Modern operational level commanders need dedicated tools to aid them in such complex tasks. Yet there is no organization, process, or technical means approved for this purpose. The following considerations are offered:

1. Organizations: The Army's highest active operational level is the corps. There are no operationally active armies or army groups which train or plan for operational level warfare. At the Joint level where peacetime operational level planning is presently conducted, there is no fixed operational unit. Joint task forces are formed ad hoc from assigned service components depending upon unique mission requirements. This may work in contingency operations, but it is not likely to prove sufficient for anything beyond such short duration actions. The lack of designated operational units which plan, train, and operate in peacetime is likely to impact on time-space-force calculations should large unit operations be conducted in future conflict. Additionally, the current and projected defense budget cuts will increasingly place any large unit peacetime activity at risk.¹⁸¹ I also consider the lack of a Joint counterpart to the Army's School of Advanced Military Studies to be a serious deficiency which indicates lack of commitment to operational art within the Joint community.

2. Processes: The Army has admirably served as the vanguard for the reintroduction of operational thinking into U.S. military thought. It has affected the lexicon of military terms to the degree that now one can even find mention of the operational level of war and operational art in JCS doctrinal publications.¹⁸² However, these publications reflect the same problem as their doctrinal forefather, FM 100-5 - they offer nothing in the way of useful processes the operational commander can use to solve his multi-dimensional time-space-force problems. Telling a commander "The campaign plan syn-

chronizes land, sea, air, and space effort...by establishing command relationships...by describing the concept of operations, by assigning tasks, and by task organizing"¹⁸³ is not likely to help him accomplish those specific tasks. The absence of useful operational processes has similarly plagued the School of Advanced Military Studies year after year. Because there are no officially sanctioned tools to aid operational level commanders, the SAMS students devise their own, ranging from modifications of CGSC Student Texts (ST 100-9, The Command Estimate) to student-designed synchronization matrices and decision/time support products to aid the decisionmaking process. In no case were approved processes adequate to aid operational time-space-force calculations. These same shortfalls seriously degrade the entire campaign planning process which is central to the conduct of operational art.¹⁸⁴

3. Technical Means: The historical evidence offered in this study points to a requirement for decentralized decisionmaking in the execution of distributed operations under conditions of uncertainty. The technical means provided today's operational commander reduce his uncertainty and allow him to influence the immediate battle (tasks of the tactical commander) but they do not seem designed to facilitate decentralized operations or aid in the planning of future operations.

It is the conclusion of this study that there is currently a serious mismatch between existing operational tools for the U.S. military and the requirements of operational level warfare. METT-T and OCOKA and the dozen other tactical tools are not only inadequate to this level of warfare, they are inappropriate. They do not convey to the operational commander that he has unique requirements, considerations, and risks. They do not help him perform his duties. Yet, there is a dearth of tools specifically designed to support warfighting at the operational level. Synchronization matrices are often suggested, but even they fail to convey the enormity of the requirement to arrange air, land, sea, and space operations to achieve synergistic vice simultaneous effects. We have adequately identified the difficult tasks of the operational warfighter, but sorely failed to design our own set of national tools appropriate to the tasks at hand. There is no substitute for operational genius, but even the genius needs adequate tools to work with.

This suggests that much work remains to be done by the Services and Joint Staff if we are truly serious about operational art as anything more than an historic artifact. We require organizations, processes, and technical means which support operational warfighting requirements. This study has consciously avoided the conclusion that the US military should (or even could)

adopt Soviet methods of scientific substantiation of military decisions, or the German processes of wargaming and command and control. A nation's military tools must fit its national purposes, philosophies, and cultural nuances. Soviet and German techniques have worked for them, but that is no indication that they would work for the US military or any other force. Yet, while we might correctly reject the Soviet and German approaches, we have offered no alternative other than to force operational commanders to solve the problem on an individual basis. That is inadequate at the operational level of war.

The final conclusion of the analysis is that the Informational and Micro-electronic Revolutions of the last 20 years might also have prompted revolutionary changes in the equation of war which have not been recognized. If those revolutions usher in the magnitude of change to time-force-space considerations witnessed by Napoleon in 1812, or Gamelin in 1940, our theoretical and doctrinal foundations for conflict may be wholly deficient. Moreover, there may not be time to develop the tools to calculate the equation of war. If these conclusions are valid, we are one generation behind in our theory of war and at least two generations behind in developing the organizations, processes, and technical means to conduct warfare within the art of the possible.

SECTION 2: RECOMMENDATIONS

It is not possible in such a brief study to analyze the Soviet and German organizations, processes, and technical means to determine appropriateness or applicability to the US problem. However, such a deliberate study would not be a bad start toward resolving the problems which I believe exist today in our means for solving the equation of war. Furthermore, as the Army has provided "point" for research into operational art, it should establish a TRADOC-sponsored study group linked to investigate the subject of operational tools in detail. The goal of such a group would be the design and integration of standard time, space, and force estimation techniques and procedures into operational command activities and educational institutions. We should also engage our best and brightest in a revised study of conflict focusing on the altered dimensions of time, space, and force brought about by the Informational and Microelectronic Revolutions. We are operating in these changed mediums daily while we continue to focus our greatest intellectual efforts, as France did in 1940, on the type of war we would rather fight than the type of conflict we are most likely to fight.

Furthermore, if the Army believes in the relevance of operational warfare, it should support the establishment of a Joint School of Advanced Military Studies, using SAMS as the prototype. This action should be undertaken even if the Army has to be the billpayer. Operational art is irrelevant at the single Service level; so long as a Joint SAMS does not exist, the study of conflict will suffer for want of inter-Service perspectives. More Service schools is not the right answer unless those schools are mutually supporting.

On a related issue, Joint doctrine (already improving), needs to be expanded to incorporate all notions of conflict, to identify Service disconnects, and to provide an authoritative single source for supporting Service doctrines. We can ill-afford to continue haggling over basic doctrinal terms such as center of gravity (see FMFM 1 for evidence). Yet, only a JCS-approved position on fundamental doctrinal issues will move this program ahead. The OJCS J7, charged with fulfilling the Chairman of the Joint Chiefs of Staff's responsibilities in this area, can not effectively compete in the Service Chief arena. This is a JCS problem requiring JCS attention.

I also believe the military needs a commonly accepted body of theoretical knowledge as the underpinning of our Joint and Service educations. This would be a great charter for an ad hoc committee of senior and retired military officers. Articulating a national theoretical base of military knowledge in a reference book would provide tremendous educational benefits to all military officers.

Finally, I would like to recommend that the School of Advanced Military Studies move gradually away from a designated focus at the operational level of war to embrace an expanded notion of advanced studies of all conflict below the strategic level. I recognize the desire to keep the focus below that level as there are other schools in later years to meet this need. However, if SAMS continues to represent its primary focus as operational level warfare, it may be seen as irrelevant. It is quite possible to argue that operational level warfare in the pure sense of the term is not only irrelevant in the current and projected geopolitical situation, but that it is impossible for the United States military to execute. On the other hand, I am convinced that operations such as JUST CAUSE do not represent operational art in the traditional sense, but that they reflect a different level of conflict response likely to be repeated in the future, and worthy of detailed study. It would be criminal for SAMS to fail to adjust to the changing nature of conflict. If we do not change our organizations to meet the realities of a new world order, we will have no one to blame but ourselves.

ENDNOTES

¹Thomas E. Griess, Series editor, The Wars of Napoleon, (Wayne, New Jersey: Avery Publishing Company), 1985, p. 9.

²Carl Von Clausewitz, On War, Indexed Edition edited by Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1976), pp. 85-86.

³James J. Schneider, "The Loose Marble - and the Origins of Operational Art," in SAMS Course Readings for AY 89-90 (Ft. Leavenworth, Kansas: School of Advanced Military Studies, March 1989), p. 85.

⁴On War, p. 383.

⁵On War, p. 141.

⁶James Schneider, SAMS Course 1 Syllabus - Foundations of Military Theory and Doctrine (Ft. Leavenworth, Kansas: School of Advanced Military Studies, 26 June 1989), p. 1-8-1; Herbert Rosinski, The German Army (New York: Frederick A. Praeger, Publishers, 1966), pp. 110-111.

⁷Clausewitz, "Two Notes by the Author on His Plans for Revising On War, Note of 10 July 1827," and "Unfinished Note, Presumably Written in 1830," in On War, pp. 69-71; see also Rosinski, pp. 110-111; and Peter Paret's essay, "Clausewitz," p. 193-194, in Makers of Modern Strategy from Machiavelli to the Nuclear Age, edited by Peter Paret (Princeton, New Jersey: Princeton University Press, 1986) for refutation of the exclusive orientation of Clausewitz's theory to Napoleonic warfare.

⁸Note: On War is problematic in many aspects. The author never intended it to be published in its present condition - it was published posthumously by his widow. Nonetheless, the collection is without equal in existing literature on the theory of war. As with other exhaustive philosophical collections (the Bible comes most directly to mind), On War does not easily lend itself to accurate extraction - its primary value lies in its whole. Because of the dialectical/metaphysical manner in which Clausewitz developed his theory of war, it is possible to extract completely contradictory quotes on the exact same topic. Hence, the reader is cautioned to "drink often and deep" from the work as a whole. The portions extracted for this section have been reviewed against analytical works of Clausewitzian scholars to avoid this trap. While they are admittedly incomplete, these propositions are thought to be an accurate representation of Clausewitz's thoughts.

⁹On War, "Unfinished Note, Presumably Written in 1830," p. 70.

¹⁰Ibid.

¹¹Peter Paret, Clausewitz and the State - The Man, His Theories, and His Times (Princeton, New Jersey: Princeton University Press, 1985), p. 382.

¹²On War, p. 75.

¹³Ibid.

¹⁴On War, p. 77.

¹⁵See especially Chapters 9-11.

- ¹⁶On War, p. 79.
- ¹⁷Ibid.
- ¹⁸Michael Howard, "The Influence of Clausewitz," in On War, p. 29.
- ¹⁹On War, p. 227, 243.
- ²⁰On War, p. 226, 282.
- ²¹On War, p. 226.
- ²²On War, p. 81.
- ²³On War, p. 82.
- ²⁴On War, pp. 83-85.
- ²⁵On War, p. 383.
- ²⁶On War, p. 528.
- ²⁷Ibid.
- ²⁸On War, p. 84.
- ²⁹Ibid.
- ³⁰On War, pp. 84-85.
- ³¹On War, p. 85.
- ³²Ibid.
- ³³Ibid.
- ³⁴Clausewitz and the State, pp. 356-357.
- ³⁵On War, p. 86.
- ³⁶Ibid.
- ³⁷On War, pp. 88-89.
- ³⁸On War, pp. 194-195.
- ³⁹Ibid.
- ⁴⁰On War, pp. 195-197.
- ⁴¹On War, p. 196.
- ⁴²Ibid.
- ⁴³On War, pp. 196-197.
- ⁴⁴See especially Chapter 15, Book Three, "The Geometrical Factor," On War, pp. 214-215.

⁴⁵Clausewitz and the State, pp. 357-358.

⁴⁶On War, p. 128.

⁴⁷See his comments on p. 128: "The distinction between tactics and strategy is now almost universal, and everyone knows fairly well where each particular factor belongs without clearly understanding why."

⁴⁸Ibid.

⁴⁹On War, p. 128.

⁵⁰On War, pp. 128-129.

⁵¹On War, p. 132.

⁵²On War, p. 132.

⁵³On War, p. 70.

⁵⁴James J. Schneider, "Theoretical Paper No. 3: The Theory of Operational Art" (Ft. Leavenworth, Kansas: School of Advanced Military Studies, 1 March 1988), pp. 6-7; James J. Schneider, AMSP Course 1 Syllabus - Foundation of Military Theory (Ft. Leavenworth, Kansas: School of Advanced Military Studies, AY 1989/1990), p. 1-14-1.

⁵⁵Richard A. Preston and Sydney F. Wise, Men In Arms - A History of Warfare and Its Interrelationships with Western Society (New York: Holt, Rinehart and Winston, 1979), p. 241.

⁵⁶On War, p.177. The quote is "The general concept of strategy....is the use of an engagement for the purpose of the war."

⁵⁷David G. Chandler, The Campaigns of Napoleon (New York: Macmillan Publishing Company, 1966), p. 161.

⁵⁸James J. Schneider, "The Theory of Operational Art - Theoretical Paper No. 3," USACGSC, Ft. Leavenworth, Kansas, 1 March 1988, p. 8.

⁵⁹James J. Schneider, "The Loose Marble - And The Origins Of Operational Art, USACGSC, Ft. Leavenworth, Kansas, 1989, pp. 86 - 87 for full discussion of this concept.

⁶⁰Preston and Wise, pp. 133-145, paragraph citation; see also Schneider, "The Loose Marble and the Origins of Operational Art," pp. 86-87.

⁶¹US Army, FM 100-5: Operations, HQDA, Washington, D.C., 1986, pg. 10.

⁶²Much of the material for this section is from class notes to A037, Military Classics Colloquia, AY 1988-1989, taught by Professor Epstein.

⁶³Men In Arms, pp. 244-250.

⁶⁴John A. English, On Infantry, Praeger Publishers, New York, 1984, pg. xix.

⁶⁵Schneider, "The Loose Marble," pp. 87-88.

⁶⁶Schneider, "The Loose Marble," pp. 95-97.

⁶⁷Schneider, The Theory of Operational Art, pg. 10.

⁶⁸Schneider, "The Loose Marble," p. 88.

⁶⁹Ibid.

⁷⁰Gordon A. Craig, "Delbruck: The Military Historian" in Makers of Modern Strategy, ed. By Peter Paret, Princeton University Press, Princeton, New Jersey, 1986, p. 341.

⁷¹Schneider, "The Loose Marble," p. 88.

⁷²See Martin Van Creveld, Command In War (Cambridge, Massachusetts: Harvard University Press, 1985), p. 95. He contends that Napoleon's command at the Battle of Jena marked the last time that a commander in chief could control the entire field of battle while taking a direct part in the conduct of the engagement.

⁷³Van Creveld, Command In War, pp. 109-115; Preston and Wise, pp. 252-253.

⁷⁴Schneider, "The Loose Marble," pp. 90-91; see also Schneider, "The Theory of Operational Art," p. 15.

⁷⁵Schneider, "The Loose Marble," p. 88.

⁷⁶This subject is eloquently developed by Professor James J. Schneider in "The Theory of the Empty Battlefield," RUSI (September 1987), pp. 37-44. See especially p. 44.

⁷⁷Schneider, "The Loose Marble," p. 87.

⁷⁸Schneider, "The Theory of Operational Art," p. 14.

⁷⁹Schneider, "The Theory of Operational Art," p. 14. The entries in Professor Schneider's paper have been slightly rearranged and reworded for the purposes of this paper. They do, however, not change the substance of his meaning.

⁸⁰FM 100-5, Operations, p. 10.

⁸¹FM 100-5, Operations, pp. 27-28.

⁸²FM 100-5, p. 33.

⁸³FM 100-5, p. 28.

⁸⁴Ibid.

⁸⁵Maurice Matloff, "The Nature of History," in John E. Jessup, Jr., and Robert Coakley, editors, A Guide to the Study and Use of Military History (Washington, D.C.: U.S. Army Center of Military History, 1982), p. 15.

⁸⁶Van Creveld, Command In War, pp. 9-10.

⁸⁷Chandler, p. 759.

⁸⁸See especially Dr. Robert Epstein's excellent articulation of this argument in his article, "The Different Levels of War In the Napoleonic Period -- Austerlitz and Friedland," in the School of Advanced Military Studies Course Readings for Course 4: The Historical Practice of Operational Art, AY 89-90, p. 2.

⁸⁹Ibid.

⁹⁰Paragraph citation: Van Creveld's Command In War, pp. 59-78; David Chandler's The Campaigns of Napoleon, pp. 367-378.

⁹¹Chandler, p. 1103.

⁹²Chandler, p. 369.

⁹³Chandler, p. 370.

⁹⁴Command in War, pp. 67-69.

⁹⁵Chandler, p. 370.

⁹⁶Ibid., p. 69.

⁹⁷Ibid., for remaining discussion on Napoleon's Staff unless otherwise noted.

⁹⁸Chandler, pp. 371-372.

⁹⁹Chandler, p. 371.

¹⁰⁰Ibid.

¹⁰¹Chandler, p. 372.

¹⁰²Thomas E. Griess, The Wars of Napoleon (Wayne, New Jersey: Avery Publishing Group, Inc., 1985), pp. 112-113.

¹⁰³Martin Van Creveld, Supplying War (Cambridge, Massachusetts: Cambridge University Press, 1984), p. 62.

¹⁰⁴Chandler, pp. 753, 761, paragraph citation.

¹⁰⁵The Wars of Napoleon, p. 109.

¹⁰⁶The Wars of Napoleon, p. 110.

¹⁰⁷See Chandler, pp. 749-861 for a detailed account of all aspects of the campaign. Another excellent summary is available in The West Point Military History Series volume, The Wars of Napoleon (West Point, New York: Department of History, 1985), pp. 108-121.

¹⁰⁸Chandler, p. 754-755, paragraph citation.

¹⁰⁹Chandler, pp. 760-765, paragraph citation; see also The Wars of Napoleon, pp. 111-112.

¹¹⁰Chandler, p. 763.

¹¹¹This summary is from Chandler, pp. 762-763.

¹¹²Chandler, p. 763.

¹¹³The Wars of Napoleon, pp. 112-113.

¹¹⁴Chandler, p. 766.

¹¹⁵The Wars of Napoleon, p. 111.

- ¹¹⁶Chandler, p. 771; The Wars of Napoleon, p. 109.
- ¹¹⁷The Wars of Napoleon, p. 112.
- ¹¹⁸Ibid.
- ¹¹⁹The Wars of Napoleon, p. 112, and Chandler, p. 766, 780.
- ¹²⁰Chandler, p. 774-776, paragraph citation; see also The Wars of Napoleon, p. 112.
- ¹²¹Chandler, p. 776.
- ¹²²The Wars of Napoleon, p. 112-113, paragraph citation.
- ¹²³The Wars of Napoleon, p. 112.
- ¹²⁴Chandler, pp. 828-853.
- ¹²⁵Chandler, p. 852.
- ¹²⁶Chandler, p. 753.
- ¹²⁷The Wars of Napoleon, p. 109.
- ¹²⁸Chandler, p. 855.
- ¹²⁹Chandler, p. 855.
- ¹³⁰Supplying War, p. 67.
- ¹³¹Supplying War, pp. 72-74.
- ¹³²Colonel H.C.B. Rogers, Napoleon's Army (New York: Hippocrene Books, Inc., 1974), p. 29.
- ¹³³Chandler, p. 756, 777.
- ¹³⁴Count Yorck von Wartenburg, Napoleon As A General (London: Kegan Paul, Trench, Trubner & Co., 1902), pp. 108-109.
- ¹³⁵Chandler, p. 756.
- ¹³⁶Chandler, p. 763.
- ¹³⁷Alistair Horne, To Lose A Battle - France 1940 (New York: Penguin Books, 1982), p. 657.
- ¹³⁸The best source for a day to day accounting of the action and motives behind the action remains Alistair Horne's To Lose A Battle - France 1940. Perhaps the most moving and intimate account of the failure is Marc Bloch's Strange Defeat. It knows no equal in terms of depth of vision, inspiration, and love of country. It should be required reading for every soldier. An additional excellent account of the fall of France is to be found in the West Point Military History Series The Second World War - Europe and the Mediterranean, Thomas E. Griess, Series Editor.
- ¹³⁹Horne, p. 127. For contrast, see Griess, The Second World War, p. 43.

- ¹⁴⁰The Second World War, pp. 45-50, paragraph citation.
- ¹⁴¹Horne, pp. 41, 55; The Second World War, p. 30.
- ¹⁴²Marc Bloch, Strange Defeat (New York: W.W. Norton & Company, 1968), pp. 36-37, 42, 43, 107, 120, 157.
- ¹⁴³Horne, pp. 36-41; The Second World War, pp. 30-31.
- ¹⁴⁴Horne, p. 41.
- ¹⁴⁵The Second World War, pp. 30-34, paragraph citation unless otherwise noted.
- ¹⁴⁶Bloch, p. 53; Horne, 65.
- ¹⁴⁷The Second World War, p. 37.
- ¹⁴⁸Horne, 58-64; 229-232.
- ¹⁴⁹Horne, 64-66, 152-155; The Second World War, pp. 35-37.
- ¹⁵⁰Horne, p. 154.
- ¹⁵¹Horne, p. 152.
- ¹⁵²Horne, p. 65.
- ¹⁵³Horne, p. 165.
- ¹⁵⁴Horne, p. 167.
- ¹⁵⁵Ibid.
- ¹⁵⁶Horne, p. 224.
- ¹⁵⁷Ibid., p. 225.
- ¹⁵⁸The Second World War, p. 44.
- ¹⁵⁹The Second World War, p. 47.
- ¹⁶⁰Bloch, p. 43.
- ¹⁶¹Horne, p. 303.
- ¹⁶²Horne, p. 303-304.
- ¹⁶³Horne, p. 304.
- ¹⁶⁴Horne, p. 306.
- ¹⁶⁵Horne, p. 312.
- ¹⁶⁶Horne, p. 321.
- ¹⁶⁷Bloch, p. 45.
- ¹⁶⁸Horne, p. 325.
- ¹⁶⁹Ibid.

¹⁷⁰Bloch, p. 47.

¹⁷¹Horne, p. 325.

¹⁷²Bloch, p. 48-49.

¹⁷³Horne, p. 327.

¹⁷⁴Ibid.

¹⁷⁵Horne, p. 62.

¹⁷⁶Bloch, pp. 51-52.

¹⁷⁷Horne, p. 332. The time compression analysis is my own, the facts on use of the '88' are Horne's.

¹⁷⁸Horne, p. 333.

¹⁷⁹Bloch, p. 107.

¹⁸⁰Bloch, p. 36.

¹⁸¹See CSI Report No. 6 - Larger Units: Theater Army--Army Group--Field Army (Ft. Leavenworth, Kansas: CSI, January 1985) for a detailed discussion of some of these considerations.

¹⁸²See for example, The Joint Chiefs of Staff, Final Draft JCS Pub 3.0, Doctrine For Joint Operations (Washington, D.C.: The Joint Chiefs of Staff, April 1989), pp. viii, 111-4.

¹⁸³JCS Pub 3.0, p. III-6.

¹⁸⁴See especially Colonel William W. Mendel and Lt.Col. Floyd T. Banks excellent study, Campaign Planning (Carlisle Barracks, Pennsylvania: U.S. Army War College, 4 January 1988).

APPENDIX

The following operational tasks were extracted from FM 100-5, CHAPTER 3, "Operational and Tactical Planning and Execution," pages 27-31:

1. The principle task of operational commanders is to concentrate superior strength against enemy vulnerabilities at the decisive time and place to achieve strategic and policy aims.
2. Ground, air, and naval operations (Joint and Combined) must be planned and synchronized for mutual support and to fulfill requirements of the campaign plan.
3. Operational commanders attempt to set "favorable terms for battle" via synchronized ground, air and sea maneuver and by striking the enemy throughout the theater of operations.
4. Commanders conduct reconnaissance, interdiction, air defense, and special operations "almost continuously."
5. Air interdiction, air and ground reconnaissance, raids, psychological warfare actions, and unconventional warfare must be synchronized to support the overall campaign, especially at "critical junctures."
6. Ground operations require the coordinated movement and effective concentration of large units (corps to army group). Traffic control, air defense, deception, and service support must be orchestrated to support basic operational movements.
7. Forces and facilities must be protected from enemy action.
8. After major operations, large unit actions will include exploitation of tactical successes or withdrawal and reorganization of units. Supporting actions will include air defense, transportation, reconnaissance and security, service support, and traffic control.
9. Operational planning begins with the receipt of strategic guidance and continues with the staff estimate and planning process in FM 101-5, or using "prescribed joint operations planning and execution systems."
10. Campaign planning entails converting broad strategic guidance into a campaign plan for a joint/combined force.
11. Focuses on the execution of the campaign plan and on staging, execution, and exploitation of major operations.
12. Implements the strategic guidance while providing direction to subordinate commanders.
13. Sets long-term goals with the theater.
14. Requires both a general concept for the whole campaign and a specific plan for the first phase of the campaign.

15. Requires the commander to specify "how the enemy is to be defeated" with available resources while aiming for the fastest possible solution at the lowest cost in lives and materiel.
16. Requires selection of an "effective method" orienting on the enemy's center of gravity, and generally avoiding a prolonged campaign.
17. Must operate within existing constraints on operational methods.
18. Requires performance of intelligence operations and analysis orienting on larger enemy forces in all dimensions within the theater.
19. Must probe the mind of the enemy commander, seeing the theater through his eyes and estimating his course of action.
20. Focuses on operational considerations of terrain to permit the commander to "direct operations far beyond his field of view and to plan well into the future."
21. Requires determination of enemy center of gravity, analysis of major factors affecting the campaign, and selection of a course of action.
22. Requires that the commander attempt to mislead the enemy about "when, where, and how he will concentrate for battle and what his ultimate aims are."
23. Requires total synchronization of air, land and sea operations.
24. The first phase plan must state the commander's intent, distribute forces, dispose the forces for the operation, and coordinate air and naval support of ground maneuver.
25. This plan must set the stage for the next battle while providing options in the form of branches and sequels.

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ADDITIONAL ISSUES FOR FURTHER STUDY

What are the operational commander's time estimation tasks and responsibilities for non-operational activities?

What is the relationship between success at the operational level and the commander's ability to conduct accurate time estimates? What are the linkages to time estimation requirements at the tactical and strategic levels?

What staff planning tools are most useful to the operational commander in making time estimates? Which best compensate for the inherent artificialities of the planning process?

What is the relationship between the importance of time estimation at the operational level and the commander's willingness to live with uncertainty? In this regard is it possible to reduce the importance and impacts of time estimation?

What is the best balance between preserving the operational commander's prerogatives and providing him with adequate information? How much more standardization in staff planning tools, doctrine, techniques and processes is possible/necessary without infringing on those prerogatives? Does this reflect national predispositions toward the conduct of warfare?