

UNCLASSIFIED
Security Class

REPORT DOCUMENTATION PAGE

DTIC

ELECTE

AUG 17 1994

S B D

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: Joint Military Operations Department			
6. Office Symbol: 1C		7. Address: Naval War College, 686 Cushing Rd., Newport, RI 02841-5010	
8. Title (Include Security Classification): BY TOO MANY NAMES - OPERATIONAL MOMENTUM (v)			
9. Personal Authors: WALLACE, THOMAS RALPH, LIEUTENANT COLONEL, U.S. ARMY			
10. Type of Report: Final		11. Date of Report: 17 June 1994	
12. Page Count: 35 pages			
13. Supplementary Notation: A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Joint Military Operations Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.			
14. Ten key words that relate to your paper: Operational Momentum, Operations, Momentum, Operational Terminology, Joint Terminology, Doctrine			
15. Abstract: Current United States Armed Forces' operational literature and doctrine uses various terms to convey a concept of operational momentum. These terms are not standardized, formally defined, nor are they used to convey a singular meaning within the same manual or treatise. This paper attempts to fulfill two purposes. First, using the concept of operational momentum it demonstrates the utility and importance of agreed upon and commonly understood terms and concepts. Second, it maintains that there is validity and utility in a concept of operational momentum. It argues that historically and in current military thought there is a generally agreed upon, but often ambiguously expressed, idea of momentum that has application for the practitioner of the operational art. The paper proposes the following definition: OPERATIONAL MOMENTUM: The employment of sustained mass (forces or effect); at a sustained rate; in innovative ways that achieve mental dominance; and exceeds the opponents ability to react in time, space, or mass. This definition is predicated on four essential elements; motion, sustainment, initiative, and mass. The paper traces the historical association of these four elements with a concept of momentum. The paper concludes that there is a requirement for standardized definitions of critical operational terms and concepts, and that operational momentum is a critical concept. It further concludes, that the operational level of war is fundamentally concerned with maintaining or gaining momentum.			
16. Distribution / Availability of Abstract:	Unclassified	Same As Rpt	DTIC Users
18. Abstract Security Classification: UNCLASSIFIED			
19. Name of Responsible Individual: Chairman, Joint Military Operations Department			
20. Telephone: (401) 841-3414/4120		21. Office Symbol: 1C	

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NAVAL WAR COLLEGE
Newport, R.I.

BY TOO MANY NAMES - OPERATIONAL MOMENTUM

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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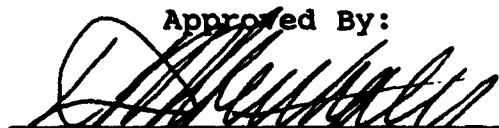
17 June 1994

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4090 94-25972



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ABSTRACT
BY TOO MANY NAMES - OPERATIONAL MOMENTUM

Current United States Armed Forces' operational literature and doctrine uses various terms to convey a concept of operational momentum. These terms are not standardized, formally defined, nor are they used to convey a singular meaning within the same manual or treatise.

This paper attempts to fulfill two purposes. First, using the concept of operational momentum it demonstrates the utility and importance of agreed upon and commonly understood terms and concepts.

Second, it maintains that there is validity and utility in a concept of operational momentum. It argues that historically and in current military thought there is a generally agreed upon, but often ambiguously expressed, idea of momentum that has application for the practitioner of the operational art.

The paper proposes the following definition:

OPERATIONAL MOMENTUM: The employment of sustained mass (forces or effect); at a sustained rate; in innovative ways that achieve mental dominance; and exceeds the opponents ability to react in time, space, or mass.

This definition is predicated on four essential elements; motion, sustainment, initiative, and mass. The paper traces the historical association of these four elements with a concept of momentum.

The paper concludes that there is a requirement for standardized definitions of critical operational terms and concepts, and that operational momentum is a critical concept. It further concludes, that the operational level of war is fundamentally concerned with maintaining or gaining momentum.

It recommends the proposed definition of operational momentum be accepted as a starting point for developing a standardized definition.

PREFACE

Space limitations require that this paper focus on the application of the concept of operational momentum to land forces. This is not to suggest or imply that the concept is not appropriate for air or sea force applications. I believe that the suggested definition is appropriate for sea and air forces.

The search for historical precedence in the works of Napoleon, Clausewitz, and Jomini dictated a ground force orientation. Because of the ground focus, the paper relies heavily on the various editions of the Army's FM 100-5, Operations to trace the development of the concept in contemporary military thought.

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NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
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By _____	
Distribution/Avail _____	
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BY TOO MANY NAMES - OPERATIONAL MOMENTUM

CHAPTER I

INTRODUCTION

"But move from the abstract to the real world, and the whole thing looks quite different."¹

Carl Von Clausewitz, On War.

War has become increasingly complex in the 20th century. The greater mobility and lethality of armed forces coupled with advancements in communications and the expansion of "battle space" have dictated refinements and re-evaluations of how war is conducted. A significant aspect of this re-evaluation was the identification and introduction of a "new" level of war, the operational level. Initially formalized by Soviet - Russian - military theorists in the 1920's, this level of war has been adopted into doctrine by the United States' Armed Forces over the past fifteen years. Exercised at least since Napoleon's campaigns, it is only in this century that attempts have been made to formally quantify and qualify the concept.

As with most new ideas, there have been difficulties in evolving the thought and defining terminology clearly communicating the operational level's concepts and implications. The United States' Armed Forces are still grappling with the development of concepts and a vocabulary to clearly express the operational level's ideas and facilitate their application.

The Air Force's, Air Force Manual 1-1. Basic Aerospace Doctrine of the United States Air Force acknowledges this problem

and proposes a novel solution:

"Many terms have several definitions; *the most important terms tend to have the most definitions.* Providing multiple definitions is intended to amplify or expand understanding of the term as commonly used. While a single rigid definition is useful for academic purposes, in practice people use terms in different ways. Multiple descriptions of the meaning of a word or phrase improve our grasp of the term and need never reduce our understanding."²(emphasis added)

It is difficult to agree with this idea. In an academic setting it is acceptable, probably required, to discuss and debate nuances of meaning. This is not acceptable in the planning or execution of military operations where slight variations in meaning can lead to misunderstanding and failure. In a setting where many communications must be short and to the point, "the most important terms" must have specific and agreed upon meanings.

The development of clear definitions takes on added importance for the contemporary practitioner and theorist of the operational level of war because it is at the operational level where most joint and combined operations occur. The lack of clear terms and concepts to assist in understanding complex ideas increases the already substantial difficulties of coordination and cooperation between services and allies. This failure to establish a clear vocabulary has given rise to a situation where as one critic has pointed out: "It is not merely that officers do not speak the word but rather that they do not think or practice war in operational terms, or do so in vague or ephemeral ways."³(italics added) Written in 1981, this comment is

unfortunately still relevant.

This paper attempts to fulfill two purposes. First, using the concept of operational momentum it will demonstrate the utility and importance of agreed upon and commonly understood terms and concepts. As with any "art" the operational art has to be understood to be appreciated. "It is the art component of the operational level which makes us uncomfortable. Part of this discomfort comes from the problems with terminology..."

Second, it suggests that there is validity and utility in a concept of operational momentum. It argues that historically and in current military thought there is a generally agreed upon, but often ambiguously and abstractly expressed idea of operational momentum that has application for the practitioner of the operational art.

At the operational level of war, despite the already substantial effort expended in developing common service and joint terms, concepts, and doctrine, there is still considerable work to be done in the conveying of critical ideas. Operational momentum is a critical idea. The operational level of war is fundamentally concerned with managing momentum. Fertile ground exists for academic discussion with the aim of gaining agreed upon and clearly expressed thoughts prior to the requirement to use the terms and concepts operationally.

CHAPTER II

DEFINITION

"I am persuaded that good definitions lead to clear ideas...."⁵
Antoine H. Jomini, The Art of War.

What is operational momentum? Before its historical antecedents or current doctrinal utility can be discussed a working definition and concept must be developed. This is not an exercise in rhetoric. A profession's words and expressions should convey concise meanings and ideas. This is particularly critical for the profession of arms where the human and material cost of misunderstandings can be extraordinarily high.

Current operational literature and doctrine uses various terms to convey a concept of operational momentum. These terms are not standardized, formally defined, nor are they used to convey a singular meaning within the same manual or treatise. Speed, tempo, maneuver, and continuous operations are the most common terms used interchangeably with momentum in an attempt to explain a singular concept. The following examples demonstrate that this lack of clarity and specificity can lead to confusion and possible misunderstanding.

A knowledgeable author defines operational momentum as: "Operational momentum, ... can be described in military terms as the combination of speed and mass of an offensive operation required to overcome resistance"⁶ Another author states: "Operational momentum is the combination of speed and mass of an offensive."⁷ Marine Corps FMFM 1, Warfighting observes: "The combination of concentration and speed is momentum."⁸ These three definitions of operational momentum are synonymous.

The problem appears when we find that the Army's FM 100-5,

Operations defines tempo as: "... a combination of speed and mass that creates pressure on the enemy."⁹ This is identical to the foregoing definitions of momentum. It would be simple to declare the terms "tempo" and "momentum" synonymous. However, FM 100-5 makes this call difficult when it explains the concept of "initiative": "... initiative ... rapid shifts in the main effort to take advantage of opportunities, *momentum* and *tempo*...."¹⁰ (emphasis added) It appears that tempo and momentum are two different concepts to the authors of FM 100-5.

The Marines also draw a distinction between tempo and momentum. FMFM 1-1, Campaigning states: "Operational tempo is the rate of work between engagements. In other words, it is the ability to consistently shift quickly from one tactical action to another."¹¹ However, the issue is clouded when FMFM 1 defines tempo as "speed over time".¹² The Marines have two definitions of tempo. Neither of which agrees with the Army definition. This is not surprising because the Army's FM 100-5 also provides a second definition of tempo which differs substantially from the first:

"Tempo, the rate of military action; controlling or altering that rate is a necessary means to initiative; all military operations alternate between action and pauses as opposing forces battle one another and fight friction to mount and execute operations...."¹³

Which definition of tempo is to be applied? Momentum to the Marine is tempo to the soldier, and both have two dissimilar definitions of tempo to choose from. Other examples of imprecise and conflicting definition and conceptual explanation abound in doctrinal literature. The Navy and Joint Chiefs of Staff publications all have different and often conflicting concepts and definitions of momentum and tempo.¹⁴

The important point is that current operational doctrine and thought does not have a standardized vocabulary with agreed upon definitions. This is not a situation conducive to the sharing of ideas, or seamless and harmonious operations - particularly joint planning and operations.

In many, if not most, cases where theorist and practitioner use the term tempo the concept they are attempting to convey might be better expressed through the use of the term and the concept of operational momentum, but not as defined above. Operational momentum is not simply speed and mass. Operational momentum as Napoleon, Clausewitz, Jomini, and others visualized it was a broader idea. To have utility for the contemporary operational lexicon, the concept of operational momentum must be broader and incorporate two additional essential components, sustainment and mental dominance of the enemy - initiative.

The proposed definition that follows incorporates the four components I believe critical to a contemporary concept of operational momentum. I believe it expresses the concept as historically visualized. The four elements are; motion, mass, sustainment, and initiative.

OPERATIONAL MOMENTUM: The employment of sustained mass (forces or effect); at a sustained rate; in innovative ways that achieve mental dominance; and exceeds the opponents ability to react in time, space, or mass.

This definition should be accepted with the understanding that the components are reinforcing, mutually supporting and can supplement each other. Similar to Newton's Second Law of Motion, the mass and motion elements can be generally viewed as inversely proportional. A greater motion can to some degree off-set a lesser mass. The converse is also applicable. Initiative and

sustainment complement and reinforce the other two components. To some degree all four components can compensate for each other. However, all four components are normally required in some degree, three can seldom compensate for the total absence of one. This does not imply a mathematical or a scientifically definable relationship. The ability of each component to support or compensate for another is situational and requires thoughtful application - the "art" dimension.

Rate is used in lieu of speed to describe the motion element. Rate, a relative term, is more appropriate. It is a greater motion relative to the opponent that is desired. This on occasion will be absolute speed but often it is a sustained motion that is more suitable and effective. Sun Tzu pointed out this subtle distinction when he wrote: "Thus while we have heard of blundering swiftness in war, we have not yet seen a clever operation that was prolonged."¹⁵

Similarly the concept of mass requires some elaboration. Mass must be understood to incorporate an idea of effect. Modern technology makes it is possible to achieve mass through concentration of firepower without numerical concentration. It is often effects that must be concentrated not absolute numbers.

Sustainment is a dual concept. First, it is the logistical, material and personnel, maintenance of the force. Second, it is continuance of effort, a steady progression of events.

The test of this definition's validity lies in an investigation of operational momentum as a concept in historical and current military thought and doctrine. The following chapter traces the development of this concept.

CHAPTER III

HISTORICAL ANTECEDENTS

"Two fundamental lessons of war experience are - never to check momentum; never to resume mere pushing."¹⁶

B.H. Liddell Hart, Thoughts on War

The importance of momentum in war dates to antiquity. Greek and Roman phalanxes depended upon momentum for success at the tactical level. The Mongols utilized momentum at the tactical and strategic level in their sweep across Asia. Rudimentary as their systems and tactics were by today's standards they all clearly understood sustainment, mass, rate of movement, and initiative.

While not formally identified or acknowledged as a separate level of war, the operational level of war began to emerge during Napoleon's campaigns. His adoption of the corps organization, the ability to sustain large formations, and his technique of moving on multiple and dispersed lines of operation and then massing at the most opportune time and place all suggest a level of war greater than the tactical but yet, not strategic.¹⁷

As the operational level of war emerged so did an idea, a concept, of operational momentum. Napoleon's Maxims VI and IX demonstrate a grasp of momentum. Maxim VI states: "At the commencement of a campaign, to advance or not to advance is a matter for grave consideration, but when once the offensive has been assumed, it must be sustained to the last extremity...."¹⁸

Maxim IX further develops the idea: "The strength of an army, like the power in mechanics, is estimated by multiplying the mass by the rapidity; a rapid march augments the morale of an army, and increases the chances of victory."¹⁹ Expressed as mass, rapidity, and sustainment are three of the four elements of momentum. While not expressed in these Maxims, most of Napoleon's campaigns clearly demonstrated mental dominance of the enemy, initiative. Napoleon appears to have had an appreciation for the concept of momentum.

Clausewitz and Jomini did not clearly identify the operational level of war, but both conveyed a sense of it. Jomini identified three levels of war; Minor Tactics, Grand Tactics, and Strategy. Jomini's Grand Tactics were very similar to the operational level.²⁰ Clausewitz also acknowledged a third level of war, but never clearly defined it or gave it a name.²¹

It is clear that both theorists had an idea of the importance of momentum in war and related this to an intermediate level of war. Jomini wrote:

*"A general who moves his masses rapidly and continually, and gives them proper directions, may be confident both of gaining victories and of securing great results therefrom."*²² (emphasis added)

*"This employment of the forces should be regulated by two fundamental principles: the first being, to obtain by free and rapid movements the advantage of bringing the mass of the troops against fractions of the enemy; the second to strike in the most decisive direction ..."*²³ (emphasis added)

Jomini identifies the four components of operational momentum, mass, relative motion, sustainment ("Continually"), and

initiative ("proper directions", "decisive direction").

Clausewitz uses the term momentum throughout On War. Book Eight, Chapters Four and Five in particular consider a concept of momentum, yet he never clearly defines the concept that is so important to understanding his discussions on culmination, pause, and his principle of continuity.²⁴

Clausewitz saw the relationship between the components of the previously postulated definition and concept of momentum. He wrote: "If an attack lacks material superiority, it must have moral superiority to make up for its inherent weakness."²⁵ He understood that lacking means, initiative must be substituted. He also realized the relationship of mass to motion: "In a battle consisting of a slow and methodical trial of strength, greater numbers are bound to make a favorable outcome more certain."²⁶

In the late nineteenth century the German Army made the greatest contribution to a continuing concept of momentum. At the turn of the century the German concept of war could be characterized as: "Unceasing progress without delay, until the organized resistance of the enemy is broken in decisive battles."²⁷ This is a partially developed sense of momentum.

Two events renewed interest in momentum and the operational level of war. The stalemate and slaughter of the First World War stimulated European and American thought. Soviet experiences in their Revolutionary Wars led to them formalizing the operational level, based largely on a concept of operational momentum.

During the 1920's the Soviets struggled to define this new level. M. N. Tukhachevsky, Soviet theorist, General, and later Chief of Staff, stressed the need for further refinement of terminology.²⁸ In a situation similar to that currently existing in the United State's Armed Forces, Soviet theorists attempted to explain the operational level with out a common vocabulary. Despite this initial lack of clear terminology a concept of operational momentum permeates Soviet writings of the period.

A 1924 work entitled "Higher Commands- Official Guidance for Commanders and Field Commands of the Army and Fleet" set out the purpose of operations.

"(1) The aim of each operation and battle is the destruction of enemy forces.... (2) That aim can be achieved only by skillful and decisive action based on simple, but artful maneuver, conducted violently and persistently. In addition, to complete a maneuver operation successfully it is necessary to assess correctly the forces and possible actions of the enemy, to supply material means for the operation and to organize firm and continuous command and control."²⁹

Tukhachevsky wrote in 1926: "Modern operations involve the concentration of forces necessary to strike a blow and the inflicting of continual and uninterrupted blows of these forces against the enemy...."³⁰ In both the directive and Tukhachevsky's work is a sense of momentum incorporating the previously postulated four components; mass, motion, sustainment, and initiative.³¹

The Soviets also struggled with defining the motion component. Their early writings used speed, tempo, momentum,

pace, and rate interchangeably and to convey different ideas. This prompted General V. K. Triandafilov to devote an entire chapter to this concept in his 1929 work, Nature of the Operations of Modern Armies. He writes: "The speed of an offensive, its pace, depends wholly on the frequency of the combat the attacker must conduct en (sic) route to the assigned target."³² Continuing: "Thus, the overall pace of an army offensive between two operations, ... depends upon the rate of the possible gradual and steady increase of forces."³³ Finally, leaving no question as to the importance of the relative nature of motion: "The rate of advance, not only must not be less than, it must exceed, the possible rate of enemy withdrawal...." (emphasis in original)³⁴

Following the Second World War the Soviets formalized these ideas in the technique of echelon, the sequential commitment of successive masses, possessing integrated support, at locations, and a rate exceeding the opponents capability to react.³⁵ This is the essence of operational momentum. This concept of operations, predicated on momentum, persisted until the demise of The Soviet Union and it can be assumed that the basic ideas persist in the Russian Army.

In the West a less formalized concept of operations and operational momentum developed in the 1920's and 30's. The primary theorists were the Englishmen B.H. Liddell Hart and J.F.C. Fuller. The primary practitioners were the German Army.

Hart was the most prolific and arguably the most influential

of the theorists. His ideas influenced the German *Blitzkrieg* doctrine and subsequent Western doctrine.³⁶ Hart did not acknowledge by name the operational level of war. He did, though not very clearly, acknowledge a level "... intermediate between the strategical and the tactical".³⁷ Hart had only a partial grasp of the concept of momentum, but a concept of movement in war, based primarily on absolute speed, dominated his thought and formed the basis for his most well known theory - The Expanding Torrent.

"We need to invent a system which will ensure ... that our attack sweeps through and overwhelms the successive layers of the defense with an unslacking momentum combined with minimum loss of men. ... Thus nature's forces carry out the ideal attack, automatically maintaining the speed, the breath, and the continuity of the attack. Moreover, the torrent achieves economy of force by progressively exploiting the soft spots of the defense."³⁸

The problem with Hart's and to a greater extent with Fuller's concepts of momentum was that they relied almost exclusively on only two of our four postulated components, movement and initiative. Both generally ignored logistical sustainment, denied any absolute value in mass, or any desirable interactive relationship between mass and motion that required trading off motion. This was no doubt a legacy of the First World War. As the concept of "The Expanding Torrent" demonstrates, Hart stressed "economy of force" even at the point of attack. Only after the Second World War did Hart discuss logistical sustainment, and then he argued that it was not an absolute requirement.³⁹

Unfortunately for the Germans, their *Blitzkrieg* doctrine also slighted logistical sustainment. They developed a doctrine based on, " . . . surprise, speed, and superiority in material or fire-power".⁴⁰ Material superiority was defined as firepower.⁴¹ The Germans stressed overwhelming mass at the point of attack in a break with Hart's concepts.

Initially this was an almost unbeatable operational doctrine. However, a horse drawn logistical apparatus and a general lack of attention to the sustainment component proved to be its weakness. The 1941 Russian Campaign demonstrated this shortcoming. *Blitzkrieg* was predicated on only a partially developed concept of momentum.

Stimulated by the experience of Vietnam, the massive Soviet conventional force build-up, and "military reformers" the United States' Armed Forces re-assessed their doctrine in the late 1970' and early 1980's. This re-assessment resulted in the formal introduction of the operational level into doctrine and with it a concept of momentum. Unfortunately, the Hart-German model of operations was emphasized over the more balanced Soviet view.⁴²

In attempting to introduce the operational level of war into American doctrine while simultaneously developing a doctrine that would allow American forces to fight the Soviets "out numbered and win", a concept of momentum evolved that lacked balance and did not meet all the conditions of the postulated definition. This failure was based to a degree on the influence of the "military reformers". The most influential of which were Edward N. Luttwak, William S. Lind, and Steven Canby.⁴³ These theorists

exerted a substantial influence on the Army's 1983 version of FM 100-5, Operations, the first attempt at formalizing the operational level of war in United States doctrine.⁴⁴ Luttwak wrote on momentum:

"THE INTANGIBLES DOMINATE. Momentum dominates other priorities (e.g. firepower capacity and lethality). ... In fact the whole operation obviously rests on the ceaseless maintenance of momentum. ... It is in the exploitation phase that while the importance of force-ratios as such declines to its lowest point, while the importance of sheer momentum is supreme. Accordingly, a progressive thinning down of the advancing columns is preferable to the more deliberate pace that full sustainability across the geographic depth would require."⁴⁵

It is difficult to agree with Luttwak that momentum is an intangible. Further, "thinning down" runs the risk of defeat in detail. The German experience in the Battle of the Bulge is one example of the problem. An attack requires some magnitude of mass and sustainment to maintain its momentum. Luttwak's concepts, with which most of the reformers agreed, predicated primarily on speed and initiative, and down playing mass and sustainment may have over influenced the Army's 1982 version of FM 100-5.⁴⁶

The 1982 version of FM 100-5, concentrated on movement, initiative, and deep attack. The Army's operational doctrine was summarized as:

"This doctrine is based on securing or retaining initiative and exercising it aggressively to defeat the enemy. ...and then following up rapidly to prevent his recovery. ... The pace must be fast enough to prevent him from taking effective counteractions."⁴⁷

The sustainment aspect of momentum was addressed only once and as a element of "Sustain the Fight". "In the attack, ... echelon forces and logistic resources in depth to maintain momentum and to exploit success."⁴⁸

In keeping with the manual's overall theme of "fighting out numbered and winning" the requirement for mass was de-emphasized throughout the manual. Though not clearly defined or explained, a partial concept of momentum was an underlying element of the 1982 FM 100-5.

That momentum was seen as a critical element of this new doctrine is confirmed in a 1982 article by Colonel Huba Wass de Czege and Lieutenant Colonel L. D. Holder, the two primary authors of FM 100-5.

"Momentum takes on added significance in this dynamic doctrine. The enemy must never be permitted to recover from the shock of the initial assault, never given the time to identify the main effort and above all, never afforded the opportunity to mass his forces or supporting fire against our main effort. To deny the enemy this critical reaction time, we must capitalize on opportunities an act faster than he does."⁴⁹

The 1982 version was strongly criticized for its dependence on initiative, deep attack and speed to compensate for lack of mass.⁵⁰ Most critics understood that equalling the Soviet's numerical superiority was not possible. However, they felt that the 1982 edition did not realistically address the problem and gave the impression that speed and initiative could completely compensate for mass. They also faulted the 1982 edition for its lack of attention to the problem of sustainment, especially in the deep attack.⁵¹

Lieutenant Colonel Holder, who would also co-author the 1986 edition, acknowledged these criticisms in a 1985 article and expressed that the forthcoming 1986 version would correct this impression of imbalance.

"... the 1982 version of FM 100-5 endorses striking the enemy where he is least prepared or before he deploys. Indirect approaches that avoid enemy strength and concentrate against the enemy's flanks or rear are the preferred means... . Firepower [mass or effects, firepower] and maneuver are regarded as equal in importance in the current FM 100-5."

The 1986 edition of FM 100-5 did correct many of these perceived shortcomings and in doing so more clearly developed the concept of momentum. Two passages demonstrate this shift.

"Momentum in the attack is achieved and maintained when **resources and forces** are concentrated to sustain operations over extended periods"⁵² (emphasis added)

"To sustain the momentum of early successes, leaders must deploy forces in adequate depth and arrange for **timely and continuous combat support and combat service support** at the outset of operations."⁵³ (emphasis added)

These passages show a clear shift in the emphasis of the manual and an increased appreciation of momentum incorporating all the elements of our postulated definition. However, despite being repeatedly used and often used to define other concepts no clear definition of momentum is offered.

This situation continues to the present. There is clearly a concept of momentum present in the 1993 version of FM 100-5. The manual continues a long history of acknowledging the concept

while failing to conclusively define it. Momentum continues to be used to explain other critical concepts with out itself having an agreed upon definition.⁵⁴ Following the Army's lead, Joint and other Service's publications suffer this same failure to provide clear definition of key and routinely used terms and concepts.

Historically a concept of momentum exists as a component of the operational art. It is a concept that has been "sensed" by most theorists and practitioners but poorly explained and seldom defined. It is a concept that encapsulates four of the critical factors influencing exercise of the operational art; mass, initiative, sustainment, and relative motion. Most theorists have viewed momentum as an idea that stresses a relationship between the four components. The concepts of momentum that have best stood the test of time are those that acknowledge all four components, particularly the Soviet concept. United States operational literature and practice is slowly acknowledging the four component's critical interrelationship and the utility of the concept for operational commanders and planners. The following chapter will address the utility of a well defined concept of operational momentum and consider its current applicability within the operational art.

CHAPTER IV

UTILITY AND CURRENT APPLICABILITY

"... very likely his attack has reached its culminating point. Its momentum is exhausted; and if the enemy is still unbroken, there is probably no future in it anyway."⁵⁵

Carl Von Clausewitz, On War.

A clear concept and definition of momentum within the operational art serves two purposes for the contemporary student, practitioner, and theorist. First, it facilitates formulating clear definitions of other critical concepts. Second, as a concept in its own right it provides a mental construct of the conditions required for successful offensive action, and for those conditions that must be defeated to enable a successful defense.

Two concepts that are especially important to successful application of the operational art are operational pause and culmination. Momentum plays an important role in defining each of these, therefore a clear definition and concept of momentum leads to a clear definition and understanding of these additional concepts. Like momentum, each of these concepts can be traced historically, and like momentum these terms are not uniformly defined or applied in contemporary operational literature or practice.

Clausewitz observed that an attack reaches its culminating point when its momentum is exhausted.⁵⁶ A standardized meaning of momentum allows a conceptualization of what causes this exhaustion. Under our postulated definition any one, or a combination of the four components could be the cause, either

mass, motion, initiative, or sustainment. In a definition where momentum is defined only in terms of speed and mass two possible causes might escape consideration, initiative and sustainment.

The Army's FM 100-5, Operations acknowledges loss of initiative as a possible cause of culmination.⁵⁷ Both FM 100-5 and Joint Pub 3-0, Doctrine For Joint Operations, acknowledge lack of sustainment as a possible cause of culmination.⁵⁸

Just as momentum is helpful in visualizing culmination, it is equally valuable to an understanding of operational pause. Using the postulated definition of momentum - an operational pause is required when an operation has lost or is in danger of losing momentum.

Again, it was Clausewitz that first documented this concept and its causes. According to Clausewitz four primary reasons could necessitate a pause. The loss of initiative, resulting in inaction, is the first possible basis for a pause - "the fear and indecision native to the human mind".⁵⁹ The second reason being a loss of mass producing an unfavorable force ratio.⁶⁰ A lack of sustainment is the third possible reason.⁶¹ Finally, a lack of movement or an inability to move requires an operational pause.⁶² Clausewitz's four factors that necessitate a pause correspond with the postulated four components of momentum.

A clear understanding of the concept and causation of operational pauses is extremely difficult without first having a clear understanding of momentum. Doctrinal literature peripherally acknowledges these four reasons as the primary factors necessitating an operational pause. There is no Joint definition of operational pause.⁶³ The concept of operation pause is directly discussed only in the Army's FM 100-5 where it

is tied more closely to phasing than to Clausewitz's concept.⁶⁴ Joint Pub 3-0, Doctrine For Joint Operations only alludes to pauses in its discussion of tempo.⁶⁵

These examples have illustrated two points. First, a clear concept of momentum is required to understand other key concepts within the operational art. Secondly, the proposed definition of operational momentum assists in understanding these concepts in their historical context and in a context with current applicability. Obviously, operational momentum has applicability in defining the operational art's concepts beyond the two examples given.

A sense and understanding of the dynamics of momentum allows the operational commander to develop a mental construct which allows a clearer "feeling" for what it is he is trying to accomplish on the battlefield. The operational level of warfare is concerned with shaping the battlefield, setting the conditions for tactical success that allow achievement of strategic objectives. Determining the point of culmination and developing plans or taking actions to avoid its premature occurrence, and determining the requirement for operational pauses are essential to operational planning. Momentum plays a key role in these decisions. The utility of a concept of operational momentum, however, goes beyond assisting in these and other critical determinations.

Controlling conditions in the operational theater and the circumstances under which battles will occur, or their avoidance, is the ultimate aim of the operational level. As the British

Commander and architect of their Second World War victories in the China-Burma Theater of Operations, Field Marshall Slim observed, "... make the enemy conform to your action, dance to your tune."⁶⁶ It is the development of the four elements comprising momentum and their exercise in a synergistic fashion that allows this dominance, this control, of the battlefield and the campaign. A balanced concept of momentum defines what it is that must be accomplished.

Momentum is often only associated with the offense. This is a constricted appreciation of momentum. The concept is equally applicable to the defense. The purpose of the defense is to deprive the enemy of his momentum while establishing the prerequisites to shift the campaign's momentum to your advantage. An understanding of the four components of momentum allows selection of the weaker or more accessible of the enemy's for attack. General Bernard W. Rogers former Supreme Allied Commander Europe understood this clearly:

"Allied Command Europe can prevent the attacker from maintaining the momentum of his assault by targeting those follow-on forces ... before they hit our General Defensive Position."⁶⁷

General Rogers saw his defensive mission in terms of depriving his opponent of momentum. General Rogers planned to do this by stripping the enemy of his ability to sustain his mass, his logistical sustainment, and the initiative.⁶⁸ By default, the enemy would lose his forward motion. This is a clear application of a mental construct of momentum, applicable to the defense, by an operational and strategic commander.

The counter attack in the defense has as a primary purpose depriving the enemy of momentum. One author with a well developed appreciation for momentum wrote:

"... a counter attack from an *operational perspective* should be designed to achieve more than reduction of a penetration. It should ultimately cause the enemy to lose his operational momentum. Moreover, once the enemy force has lost that momentum, the operational commander must seek to stretch out his dominance of the battlefield, to retain the initiative."⁶⁹ (emphasis added)

While destroying the enemy's momentum the defender can begin to establish all the components and conditions, except motion, for regaining battlefield dominance - momentum. The defender can develop innovative plans, build-up his logistical sustainment, and generate mass (forces or capability). The timely launching of the counter attack supplies the motion element. If these steps are artfully executed, the momentum of the operation will now be in the hands of the previously defending force. The controlling of momentum and developing the conditions that allow this control is the fundamental concern of the operational level commander.

A clear concept and understanding of momentum's applicability to the operational level of war allows commanders to develop a clear mental picture of what they are trying to accomplish. A clear concept demands a mental check list of elements that must be considered and balanced against each other, and the situation at hand - the application of the operational art. The proposed definition of momentum provides this checklist.

CHAPTER V

CONCLUSIONS

"When a man has climbed, by hard effort, to a ridge from which he gets a fresh vista - if only of further ridges beyond - he will usually find, when he tries to tell of it, that those who have remained in the valley insist that there is nothing beyond what they can see."⁷⁰

B. H. Liddell Hart, Thoughts On War

There is a concept, a sense, of momentum in historical and contemporary thought on the nature of operational art. This idea of momentum is not clearly developed. The acceptance of the "scientific" definition of momentum, speed and mass, within the lexicon of the operational art is too constrictive and does not fully represent the concept as historically visualized or contemporary applied.

This paper has presented for consideration a concept and definition of operational momentum:

OPERATIONAL MOMENTUM: The employment of sustained mass (forces or effect); at a sustained rate; in innovative ways that achieve mental dominance; and exceeds the opponents ability to react in time, space, or mass.

This definition is predicated on four essential elements; motion, sustainment, initiative, and mass. The definition is hopefully true to the historical perception of momentum and simultaneously is relevant to the contemporary practitioner. The operational level of war is fundamentally concerned with maintaining or gaining momentum. Therefore, it is critical that operational commanders and practitioners at all levels understand

the concept of momentum. Without a clear concept of momentum other critical ideas such as culmination and pause become much more difficult to understand and apply.

However, the definition and explanation as presented in this paper should not be accepted as fully definitive nor as the final word. They should suggest a starting point for formal development of an agreed definition within Service and Joint literature.

Until the United States Armed Forces Develop agreed upon definitions and concepts to explain the operational level of war and the operational art, the art aspect will remain abstract. This is a dangerous situation and not conducive to successful Joint operations. Contrary to the Air Force's assertion that, "Multiple descriptions of the meaning of a word or phrase improve our grasp of the term and need never reduce our understanding.", it is important that a profession have agreed upon definitions of those terms and concepts that are most critical to the its success. Momentum is such a term. There cannot be a comprehensive understanding of the operational art without an understanding of momentum.

ENDNOTES

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3. Edward N. Luttwak, "The Operational Level of War," International Security, Winter 1980/81, p. 61.
4. John F. Meehan III, "The Operational Trilogy," Parameters, Autumn 1986, p. 12.

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5. Antoine H. Jomini, The Art of War. Trans. G.H. Mendell and W.P. Craighill (Philadelphia: J.B. Lippincott, 1862), reprint ed. (Westport CT: Greenwood Press, 1971), p. 230.
6. Brian A. Lovatt, The Essentials of Operational Momentum (Fort Leavenworth, KS: School of Advanced Military Studies, U.S. Army Command and General Staff College, 1987), p. 1.
7. M. N. Vego, "Fundamentals of Operational Design." Draft Research Paper, (U.S. Naval War College, Newport, RI: 1994), p. 46.
8. U.S. Marine Corps, FMFM 1, Warfighting, (Washington: 1989), p. 32.
9. U.S. Army, FM 100-5, Operations (Washington: 1993), p. 7-3.
10. Ibid. , p. 6-16.
11. U.S. Marine Corps, FMFM 1-1, Campaigning (Washington: 1990), p. 72.
12. FMFM 1, p. 32.
13. FM 100-5, 1993, p. Glossary-9.
14. U.S. Navy, Naval Doctrine Publication (NDP) 1, Naval Warfare (Draft), (Washington: 28 March 1994), p. 40; gives the Navy definition of tempo. "Tempo is the pace of action - the rate we drive events. Neither, U.S. Joint Chiefs of Staff. Joint Pub

1-02, Department of Defense Dictionary of Military and Associated Terms (Draft) (Washington: 1989); nor U.S. Army, FM 101-5-1, Operational Terms and Symbols (Washington: 1985) define either tempo or momentum. Joint Chiefs of Staff, Joint Pub 3-0, Doctrine For Joint Operations, (Washington: 1993); and, Joint Pub 5-00.1, Doctrine For Joint Campaign Planning (initial draft), (Washington: June 1992), both use the terms tempo and momentum throughout without definition and in often contradictory appearing contexts.

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18. Napoleon I, The Military Maxims of Napoleon, ed. and trans. David G. Chandler (New York: MacMillan, 1988), p. 57.

19. Ibid. , p. 58.

20. Jomini, pp. 11, 59-64.

21. Wallace P. Franz, "Two Letters on Strategy: Clausewitz' Contribution to the Operational Level of War," Michael I. Handel, ed., Clausewitz and Modern Strategy (Portland, OR: Frank Cass, 1986), pp. 172-174; Franz, "Maneuver", pp. 3-5; Clausewitz, pp. 206-207, 225, 379.

22. Jomini, p. 161.

23. Ibid. , p. 328.

24. Clausewitz, pp. 81-83, 217-219, 595-602, 625-626; Bernard Brodie, "A Guide To The Reading of On War," Carl Von Clausewitz, On War, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), p. 703.

25. Clausewitz, p. 545.

26. Ibid. , p. 283.

27. Colmar von der Goltz, The Nation in Arms: A Treatise on Modern Military Systems and the Conduct of War, 5th ed. trans. Philip A Ashworth (London: Hugh Rees, 1906), p. 5; quoted in Stephen A. Bourque, Maneuver and Destruction: A Refinement of Operational and Tactical Offensive Doctrine, (Fort Leavenworth, KS:

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33. Ibid.

34. Ibid. , p. 167.

35. Bernard W. Rogers, "Follow-On Forces Attack (FOFA): Myths and Realities." NATO Review, December 1984, pp. 2.

36. Larry H. Addington, The Blitzkrieg Era and The German General Staff, 1865-1941 (New Brunswick, NJ: Rutgers University Press, 1971; reprint, Ann Arbor, MI: University Microfilms International, 1984), p. 32-33.

37. Hart, Thoughts on War, p. 55.

38. Ibid. , p. 304.

39. B. H. Liddell Hart, The Revolution in Warfare (New Haven, CT: Yale University Press, 1947), pp. 1-6, 16.

40. Ferdinand O. Miksche, Attack, A Study of Blitzkrieg Tactics (New York: Random House, 1942; reprint, Fort Leavenworth KS: U.S. Army Command and General Staff College, School Of Advanced Military Studies (AMSP Course 1), 1986), p. 6.

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42. John L. Romjue, From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-1982 (Fort Monroe, VA: United States Army Training And Doctrine Command, 1984), pp. 56, 70.

43. Paul T. DeVries, "Maneuver and the Operational Level of War," Military Review, February 1983, p. 7.

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46. Romjue, pp. 13-21, 58. Luttwak and Lind were invited to review the 1982 draft of FM 100-5.

47. U.S. Army, FM 100-5, Operations (Washington: 1982), p. 2-1.

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49. Huba Wass de Czege and L. D. Holder, "The New FM 100-5," Military Review, July, 1982, p. 63.

50. The following articles present some of the most balanced criticisms of the 1982 edition of FM 100-5. John S. Doerfel, "The Operational Art of the AirLand Battle," Military Review, May 1982, pp. 3-10; William G. Hanne, "AirLand Battle: doctrine not dogma," International Defense Review, v. 16, no. 8 (1983). pp. 1035-1040; Ramon Lopez, "The AirLand Battle Controversy: who is being short-sighted," International Defense Review, v. 16 n. 11 (1983), pp. 1551-1555; Jon S. Powell, "AirLand Battle: The Wrong Doctrine for the Wrong Reason," Air University Review, May-June 1985, pp. 15-21.

51. Bloomer D. Sullivan, "Logistical Support for the AirLand Battle," Military Review, February 1984, pp. 2-16.

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55. Clausewitz, p. 626.

56. Clausewitz, pp. 258, 527, 625-626.

57. FM 100-5, p. 6-8.

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