Best
Available
Copy

AD-A284 242

Joint Campaign Design: Using a Decide-Detect-Attack (DDA) Methodology to Synchronize the Joint Force's Capabilities Against Enemy Centers of Gravity

A Monograph
by

Major Robert C. Johnson
Field Artillery

DTIC
ELECTE
SEP 0 7 1994
S G D

94-29041

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

Second Term AY 93-94

Approved for Public Release; Distribution is Unlimited

DTIC QUALITY INSPECTED 3

94 9 06 134

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
6 MAY 1994

3. REPORT TYPE AND DATES COVERED
MONOGRAPH

4. TITLE AND SUBTITLE
JOINT CAMPAIGN DESIGN: USING A DECIDE-DETECT-ATTACK (DDA) METHODOLOGY TO ~~FOCUS~~ SYNCHRONIZE THE JOINT FORCE'S CAPABILITIES AGAINST ENEMY CENTERS OF GRAVITY.

5. FUNDING NUMBERS

6. AUTHOR(S)
MAJOR Robert C Johnson, U.S. ARMY

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
School of Advanced Military Studies
ATTN: ATZL-SWV
Ft. Leavenworth, KS
Com (913) 684-3437 DSN 552-3437

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

SEE ATTACHED SHEET

DTIC QUALITY INSPECTED 3

14. SUBJECT TERMS
- SEQUENCING OPERATIONS
- SYNCHRONIZATION
- CAMPAIGN PLANNING
- DECISIONMAKING
- JOINT WARFARE
- CENTER OF GRAVITY
- CAMPAIGN
- THEATER STRATEGY
- OPERATIONAL ART
- JOINT DOCTRINE

15. NUMBER OF PAGES
53

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT
unclassified

18. SECURITY CLASSIFICATION OF THIS PAGE
unclassified

19. SECURITY CLASSIFICATION OF ABSTRACT
unclassified

20. LIMITATION OF ABSTRACT

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std Z39-18
298-102

SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Major Robert C. Johnson

Title of Monograph: Joint Campaign Design: Using a Decide-Detect-Attack (DDA) Methodology to Synchronize the Joint Force's Capabilities Against Enemy Centers of Gravity

Approved by:

LTC Stephen M. Lutz, MA — Monograph Director

Robert H. Berlin, Ph.D. — Deputy Director, School of Advanced Military Studies

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

Accepted this 6th day of May 1994

Accesion For
NTIS CRA&I ☒
DTIC TAB ☐
Unannounced ☐
Justification
By
Distribution /
Availability Codes
Dist | Avail and / or Special
A-1

ABSTRACT

Joint Campaign Design: Using a Decide-Detect-Attack (DDA) Methodology to Synchronize the Joint Force's Capabilities Against Enemy Centers of Gravity By Major Robert C. Johnson, USA, 54 pages.

An examination of Joint Pub (JP) 5-00.1, Joint Tactics, Techniques, and Procedures for Campaign Planning, reveals two major disconnects. The publication asserts that the essence of operational art lies in protecting and maintaining the integrity of friendly centers of gravity while concentrating military resources against the enemy's in a way that results in the JFC obtaining the strategic or operational advantage. However, the publication does not deal with the critical issue of how the joint force commander can identify center's of gravity.

JP 5-00.1 also seeks to provide a methodology for translating theater strategy into an implemented campaign plan and to sequence and synchronize the employment of all available land, sea, air, special operations and space forces. Instead, it provides a description of several concepts without tying them together into a usable process. The result is JP 5-00.1 does not provide a comprehensive methodology for developing a campaign plan or synchronizing the use of the joint force's assets.

This monograph corrects JP 5-00.1's deficiencies by providing a means to identify centers of gravity and a framework from which to synchronize the joint force's attack. Theory and doctrine are the basis from which to: examine Carl von Clausewitz's concept of center of gravity (COG); look at how each service approaches the attack of COGs; discuss the Mendel-Tooke and Warden models for identifying COGs; and to modify the tactical targeting process for use at the operational level.

Combining the above with the traditional doctrinal concepts of operational design (lines of operation, decisive points, culmination, and arranging operations) yields the Decide-Detect-Attack methodology that both identifies centers of gravity and effectively and efficiently synchronize the joint force's attack.

The monograph concludes by recommending the writers of joint doctrine include the Decide-Detect-Attack Methodology as a component of Joint Pub 5-00.1.

TABLE OF CONTENTS

I. Introduction....1

II. Examination of Theory....5

Clausewitz's Center of Gravity....6

III. Examination of US Armed Forces Doctrine....10

Army Doctrine....11

Air Force Doctrine....11

Navy Doctrine....13

Marine Corps Doctrine....13

Joint Doctrine....15

IV. Selection of the Center of Gravity....15

The Mendel-Tooke Method....17

Warden's Five Rings....19

V. Decide-Detect-Attach (DDA) Methodology....26

Tactical Level: Decide-Detect-Deliver....27

Operational Level: Decide-Detect-Attack....32

VI. Conclusions....38

Endnotes....41

Bibliography....47

Joint Campaign Design: Using a Decide-Detect-Attack (DDA) Methodology to Synchronize the Joint Force's Capabilities Against Enemy Centers of Gravity.

> **"The joint campaign is oriented on the enemy's strategic and operational centers of gravity."[1]**
>
> **Joint Publication 1**

I. INTRODUCTION

Commanders at the operational level of war translate their nation's strategic aims into achievable tactical missions through the practice of operational art.[2] Operational art determines when, where, and why the joint force will fight. It also provides a structure for the efficient use of resources to achieve objectives and a means for designing campaigns and major operations. Additionally, operational art considers the employment, arrangement, and synchronization of the joint force in terms of time, space, and purpose.[3]

Successful prosecution of war at the operational level requires the joint force commander (JFC) to describe the military conditions that constitute the strategic end state.[4] The JFC then determines what sequence

of actions (or major operations) will produce those military conditions and how best to apply interagency and joint force resources to accomplish that sequence of actions.[5] The JFC articulates his vision of how the force will conduct the operation through his commander's intent. Physical expression of the JFC's intent occurs through use of the campaign.

A campaign is a series of related military operations designed to achieve strategic and operational objectives within a given time and space. Campaigns link tactical actions to strategy by the common thread of strategic objectives. In short, operational art is the translation of strategic objectives into a campaign with tactical objectives that are specific, tangible and achievable.[6]

Joint Pub (JP) 5-00.1, Joint Tactics, Techniques, and Procedures (JTTP) for Campaign Planning, assists the JFC by providing him useful concepts for campaign design: centers of gravity, lines of operation, culmination, decisive points, and arranging operations.[7] JP 5-00.1 asserts that the essence of operational art lies in protecting and maintaining the integrity of friendly centers of gravity while concentrating military resources against the enemy's in a way that results in the JFC obtaining the strategic or operational advantage.[8] This would account for JP 5-00.1's inclusion of the concept of center of gravity among the fundamentals of joint campaign design. In essence, the fundamentals of joint campaign plans:

- Provide broad concepts of operations and sustainment for achieving national or theater strategic objectives.

- Provide an orderly schedule of decisions.

- Achieve unity of effort with land, sea, air, special operations, and space forces, in conjunction with interagency and combined forces, as required.

- Incorporate the theater commander's strategy.

- Orient on strategic and operational centers of gravity of the threat or instability.

- Protect friendly centers of gravity and attack enemy centers of gravity.

- Phase a series of related operations.

- Compose subordinate forces and designate command relationships.[9]

However, nowhere in the document does JP 5-00.1 deal with the critical issue of how to accurately identify either enemy or friendly centers of gravity.

A second problem is that JP 5-00.1 does not provide the JFC with a comprehensive methodology to sequence and synchronize the employment of all available land, sea, air, special operations and space forces in an attack of enemy centers of gravity. JP 5-00.1 provides the following as a methodology to attack of centers of gravity:

- Conduct intelligence preparation of the theater to identify potential enemy centers of gravity.

- Use special operations forces to gather intelligence on centers of gravity.

- Position the force within operational reach of centers of gravity.

- Attack deep enemy strategic centers of gravity to gain an early decisive advantage using deep-ranging capabilities such as air and missiles.

- Conduct enhanced SOF operations to directly or indirectly attack enemy centers of gravity.

- Make extensive use of joint maneuver to gain a positional advantage relative to enemy centers of gravity.[10]

Examination of the preceding comments uncovers several flaws in JP 5-00.1's methodology. JP 5-00.1 suggests that the JFC conduct intelligence preparation of the battlefield and use his special operations forces to identify enemy centers of gravity. However, as previously noted, JP 5-00.1 does not discuss how to identify centers of gravity. JP 5-00.1 also suggests that the JFC position his forces relative to and that he attack the enemy's centers of gravity early with his deep ranging capabilities. Again the same problem, since the JFC cannot identify them, it stands to reason that he cannot properly position his forces near, or conduct deep attacks against enemy centers of gravity.

Another flaw is that JP 5-00.1's approach does not form a methodology, but rather a series of suggestions and ideas that do not describe how the JFC can focus or synchronize his force's attack on enemy centers of gravity. Despite the importance attached to the concept of center of gravity, JP 5-00.1's failure to explain how to identify them coupled with the flaws in its attack methodology, leads one to conclude that there is sufficient cause to question the validity of much of JP 5-00.1's doctrine.

The purpose of this monograph is to correct the deficiencies noted in JP 5-00.1. The monograph does this by providing the JFC with a means to

identify centers of gravity and a Decide-Detect-Attack (DDA) Methodology as the framework to focus the joint force's capabilities against the enemy's center(s) of gravity.

The monograph fulfills the requirements discussed above through an examination of military theory and doctrine. Theoretical and doctrinal concepts are the basis from which to: examine Carl von Clausewitz's concept of center of gravity (COG);[11] look at how each service approaches the attack of COGs; and to lay a foundation from which to develop the dual methodology that identifies centers of gravity and facilitates the joint force's attack. The monograph concludes with the recommendation that the joint doctrine writers include the Decide-Detect Attack (DDA) methodology as a part of JP 5-00.1.

II. EXAMINATION OF THEORY

Nineteenth century military theorist Carl von Clausewitz receives credit as the first to write on the concept of center of gravity which he introduced in his seminal work On War. Clausewitz began writing On War in the early part of the nineteenth century in an effort to explain his theory of war. However, he died having revised Book I, the other seven books remaining in "draft" form. Therefore, in its current form (with the exception of Book I), On War is an incomplete work. Coupled with this are

several other factors which make it most difficult for the JFC to either understand the concept or identify COGs.

A plethora of military books, journals, academic texts, and doctrinal publications seek to explain the concept of COG.[12] Unfortunately, few of these are in agreement as to the definition of COG. Contemporary interpretations suffer from possible linguistic and historic errors considering the original documents are in German. Also, Clausewitz's wife edited and published On War after her husband's death. Given these factors, additional attempts to explain "what" Clausewitz meant by COG could only add to the existing confusion and in the end contribute little to the JFC's clarity of understanding. A potential solution lies in determining the "why" as opposed to explaining the "what" behind Clausewitz's definition. To do so requires a review of his writings in On War.

CLAUSEWITZ'S CENTER OF GRAVITY

Clausewitz first used "center of gravity" in Book IV of On War, applying the term within the context of a discussion on the relationship between battle and war. He wrote: ". . . the essence of war is fighting, and since the battle is the fight of the main force, the battle must always be considered the true center of gravity of the war."[13] Clausewitz's inadequate explanation of COG in Book IV only creates confusion when compared to later definitions.

A detailed discussion of COG appears in Book VI where he uses the term as a heuristic device to clarify his concept of "the scale of a victory's sphere of influence."[14] His explanation included this simple and understandable definition:

> "A center of gravity is always found where the mass is concentrated most densely. It presents the most effective target for a blow; furthermore, the heaviest blow is that struck by the center of gravity. The same holds true in war. The fighting forces of each belligerent—whether a single state or an alliance of states—have a certain unity and therefore some cohesion. Where there is cohesion, the analogy [emphasis added] of the center of gravity can be applied. Thus these forces will possess certain centers of gravity, which, by their movement and direction, govern the rest; and those centers of gravity will be found wherever the forces are most concentrated."[15]

Clausewitz further elaborated in Book VI prescribing:

> "Our position, then, is that a theater of war, be it large or small, and the forces stationed there, no matter what their size, represent the sort of unity in which a single center of gravity can be identified."[16]

According to the above comments, the JFC merely has to locate the greatest mass or greatest concentration of enemy forces within a given theater of war to identify the COG. Additionally, the JFC must identify for protection his own greatest mass or greatest concentration of forces. However, in doing so he would be guilty of grossly taking Clausewitz out of context, for Clausewitz said:

> "The last book [Book VIII] will describe how this idea of a center of gravity in the enemy's force operates throughout the plan of war. In fact, that is where the matter properly belongs; we have merely drawn on it here in order not to leave a gap in the present argument."[17]

In Book VIII Clausewitz presents his most detailed and comprehensible discussion on the topic:

> "One must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends. That is the point against which all energies should be directed."[18]

Clausewitz then goes on to indicate by examples what he means by the "hub of all power." In his discussion of some of the past "Great Captains" (Alexander, Gustavus Adolphus, Charles XII, and Frederick the Great), Clausewitz declares that their armies were the COG. He validates his declaration stating: "if [their] army had been destroyed, they would have gone down in history as failures."[19] He then suggested the following as possible COGs: the opposing nation's army; the capital in countries subject to domestic strife; the army of a nation's protector; the convergent national interests among allies; and the leader's personalities and public opinion in popular uprisings.[20]

It appears as though Clausewitz was using examples to help clarify an analogy (center of gravity) which he had developed earlier to explain another concept (scale of a victory's sphere of influence). The resultant confusion is understandable. To achieve clarity, it is necessary to take a more fundamental look at the concept of COG.

The term COG derives from a translation of the German term *schwerpunkt*: *schwer* meaning "heavy" and *der punkt* meaning the "point

or spot."[21] Examination of the concept from a scientific (physics) point of view, COG literally means the point at which gravitational pull is equal in all directions. Figuratively, it means focal point. Contemporary German military forces use this term to describe the point of main effort. They express it as *schwerpunkbildung*.[22] Clausewitz's "mass is concentrated most densely concentrated" definition reflects consideration of the schwerpunkbildung. His other definitions and descriptions lead one to conclude that identifying the enemy's source of strength is the key to finding the COG(s), the exception being his comment that "the battle must always be considered the true center of gravity. . . ."

Having examined the concept of COG in some detail, it is evident that Clausewitz did not intend to provide a single definition or description. Three arguments offer plausible explanations for the "why" behind Clausewitz's multiple definitions and descriptions.[23]

Clausewitz may have been attempting to present political and military leaders with an analytical tool. By considering the various examples presented in the discussion surrounding the "hub of all power" definition, political and military leaders would be at least attempting to identify the point or points in which to direct or focus their efforts.

Another plausible explanation is that Clausewitz sought to give political and military leaders a list of possible COGs so that they could go through the mental process of determining if one existed. Finding the

absence of a COG is just as instructive as finding one. In the absence of one, the political and military leadership should attempt to identify what could become a COG and then take actions to prevent it from forming.[24]

Clausewitz's idea is most plausible when one looks at it in terms of efficiency, effectiveness, and cost benefit. He could be making the point to fight wars economically. Correct identification of a COG provides political and military leaders with a point or points from which whose attack they can get the greatest benefit for the least cost. The last statement gets at the essence of Clausewitz's thought behind the concept: trying to maximize the use of one's forces against the enemy in the most efficient and effective way to destroy the enemy force or his will to continue fighting.[25]

III. EXAMINATION OF DOCTRINE

Within the US Armed Forces each service publishes a capstone doctrinal manual which serves as the organization's authoritative foundation for subordinate doctrine, force design, materiel acquisition, professional education, individual and unit training, and outlines their approach to warfare. A review of the various service doctrines shows how each has embraced the concept of COG and its utility in waging war.

US ARMY DOCTRINE

Field Manual (FM) 100-5, Operations, is the Army's authoritative doctrinal publication and as such, establishes the frame of reference for all of the Army's doctrine. FM 100-5 reveals that the Army holds the following view of COG:

> "The center of gravity is the hub of all power and movement upon which everything depends. It is that characteristic, capability, or location from which enemy and friendly forces derive their freedom of action, physical strength, or will to fight."[26]

Using the above definition as its base, FM 100-5 describes several examples of potential COGs. The mass of enemy units is a possible COG. Abstract concepts such as the enemy's national will or his alliance structure are also possible examples of COGs. Tangible concepts such as strategic reserves, command and control, or industrial bases and lines of communication are also potential COGs.[27] The Army further believes COG is useful as an analytical tool, causing the JFC and his staff to consider friendly and enemy's sources of strength as they design the campaign.[28] The essence of the Army's belief that the COG is an enemy strength is in line with Clausewitz's "hub of all power" definition.

US AIR FORCE DOCTRINE

Air Force Manual (AFM) 1-1, Basic Aerospace Doctrine is the Air Force's source document for their doctrine. An examination of this manual

reveals that the Air Force holds one view of the concept of COG, but expresses it two ways. Their first way of expressing COG is the same as the Army's. In the Air Force's interpretation, the enemy's combat forces, the enemy's will to resist, his political alliances, the civil population, or other sources of power are examples of potential COGs.[29] At this point, one could conclude that the Air Force agrees with the Army that COGs equate to the enemy's strengths.

The Air Force's second way to express COG is in the following: "successful strategic attack operations depend on proper identification of the enemy's vulnerabilities--centers of gravity."[30] The last passage suggests that the Air Force also equates COGs to enemy vulnerabilities. In the context of the last definition, the Air Force offers several examples of possible COGs. Against a modern industrialized opponent in a conventional or nuclear war, possible COGs are the enemy's industrial infrastructure, logistical system, population centers, and command and control apparatus.[31] Against a less industrialized opponent, the political or materiel support the enemy obtains from noncombatant allies could be considered a COG.[32] Despite the differences of expression, the Air Force essentially holds to one view.

While the Army and Air Force share the same view, the Air Force uses a different definition for COG:

> "That characteristic, capability, or locality from which a military force derives its freedom of action, physical strength, or will to fight."[33]

The preceding statement is the authoritative definition from joint doctrine which the Air Force has seen fit to adopt, while the Army chooses to formulate its own definition. However, despite the slight differences in wording, the two services appear to be in agreement as to the meaning of COG.

US NAVY DOCTRINE

Currently, the Navy has not published or stated their official doctrinal position on the concept of COG. The Navy does not publish overarching doctrinal manuals like those of the other services. Instead, the Navy uses its Maritime strategy much like how the other services use their doctrine: as the "key element" in shaping programmatic decisions.[34] However, in none of its discussion does the Navy's Maritime Strategy embrace the concept of COG.

USMC DOCTRINE

Field Marine Force Manual (FMFM) 1, Warfighting, contains the USMC's keystone doctrine. An examination of this manual reveals the USMC's view of the COG is significantly different than those of the Army or Air Force. While the Army and Air Force seek to determine the source of the enemy's strengths, the Marines instead focus on identifying and attacking critical enemy vulnerabilities[35]:

> "Applying the term [center of gravity] to modern warfare, we must make it clear that by the enemy's center of gravity we do not mean a source of strength, but rather a critical vulnerability."[36]

The variations in service philosophies are due to institutional differences. Whereas the Army and Air Force usually have the capability to physically destroy the enemy, the Marines usually do not. Therefore, the Marines seek to "shatter the enemy's cohesion, organization, command, and psychological balance through the attack of enemy vulnerabilities."[37]

Examples of critical vulnerabilities appear in a discussion of enemy "surfaces and gaps." Surfaces represent strengths, while gaps represent weaknesses. Gaps may be physical (such as undefended points in the enemy's defensive line) or gaps may stem from the function of time and space (such as a unit caught in open terrain).[38]

The USMC's view offers a good balance to that of the Army and Air Force. While the former seeks to exploit vulnerabilities the latter two seek to attack strengths. The USMC's institutional belief leads them to identify a frame of reference for COG in keeping with their service's capabilities. Analysis from a Clausewitzian view shows that the various service definitions, while not adhering to the letter of the writings in On War, all seem to embrace *schwerpunkt* by providing their service a point on which to focus their efforts.

US JOINT DOCTRINE

As noted during the discussion of the Air Force's doctrine, the overarching definition for COG is in Joint Publication (JP) 3-0, Doctrine for Unified and Joint Operations. JP 3-0 is the keystone manual that sets forth the doctrine to govern unified and joint operations. The manual is applicable to the Joint Chiefs of Staff, the Joint Staff, combatant commands, joint task forces, other subordinate commands, and forces of one combatant command or Service attached to or supporting another combatant command or service.[39] JP 3-O is also the authority to resolve disputes between Services on matters of interpretation. The manual states:

> "the doctrine in this publication is authoritative and not directive . . . if conflicts should arise between the contents of this publication and the contents of Service publications, this publication will take precedence . . . "[40]

Given that there appears to be two interpretations of the concept of center of gravity (strengths and vulnerabilities), this monograph will adhere to JP 3-0's definition in an effort to maintain continuity of thought.

IV. SELECTION OF THE CENTER OF GRAVITY

Clausewitz wrote "the first task, then, in planning for war is to identify the enemy's center of gravity, and if possible trace them back to a single one."[41] However, for contemporary campaign planners the key conceptual difficulty is identifying the COG.

Colonel William Mendel, US Army, Retired, and Colonel Lamar Tooke, US Army, wrote an article titled "Operational Logic: Selecting the Center of Gravity."[42] In it they describe a method that would be useful in helping the JFC to select COGs.

Their premise is that there exists a strong linkage between strategic aims and the COG, which defines a selection process useful to the JFC and his staff. Understanding this relationship will lead to a logical conclusion in the selection of the COG. Their method is based on the following two principles concerning the relationship between the COG and aims or objectives:

> - COGs are derivative of the aims or objectives established at the level for which one is planning (strategic, operational, or tactical).
>
> - Aims or objectives established at the operational and tactical levels should contribute a force's ability to impose its will over the COG at the next higher level of war.[43]

Mendel and Tooke are quick to point-out that their method is not designed to be a formula or prescription, but it will it serve as a point of departure in the process of selecting a COG. Additionally, they declare that selection of a COG with any degree of certainty requires a great deal of thinking and discussion. When attempting to apply their methodology, one should submit each potential COG to a validity test by asking: If I desire to impose my will upon this COG, will that action create a cascading,

deteriorating effect on morale, cohesion and will to fight that prevents my enemy from achieving his aims, and allows the achievement of my own? Further, if I have selected a valid COG, do I have a feasible ability to impose my will over it?

THE MENDEL-TOOKE METHOD

Use of the methodology at Figure 1 begins when the political process establishes the national aims and sets the conditions for the use of military power. The second step is for military strategists to determine the appropriate military strategic aims that adequately support the political ends.

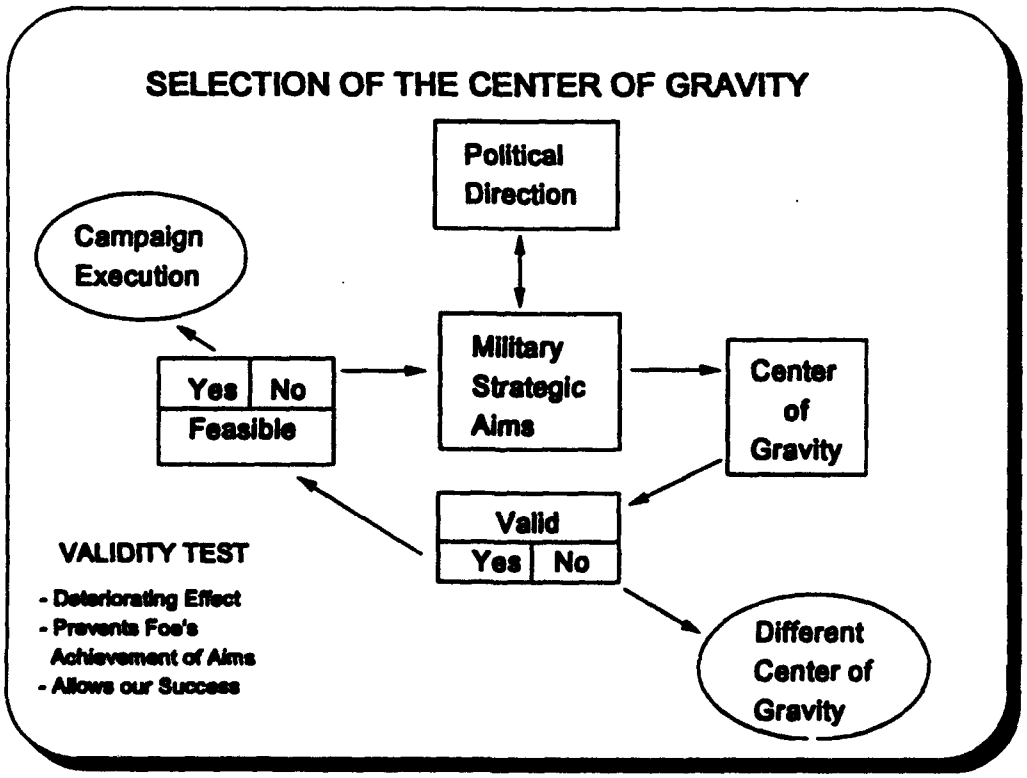

Figure 1.

Based on the strategic aims, the third step is to consider potential COGs by submitting them to the following validity test: Can imposing our will upon the selected COG create the deteriorating effect that prevents our foe from achieving his aims and allows the achievement of our aims? If the answer is no or not completely, consider another potential COG. If the answer is yes, then the COG is valid. Mendel and Tooke also point-out that it is possible at the operational and tactical levels to have more than one valid COG, but the usefulness of having a COG declines as they proliferate.

The fourth step is to determine the feasibility of imposing your will over a COG. Given that the capability exists, you should then proceed with campaign planning. If you do not have the ability to impose your will over a valid COG, then it is time to consider readjusting the strategic aims and consideration of COGs based on the adjusted aims. Follow the adjustment with another feasibility check to determine the capability for imposing your will on the potential COG.

The final step is to verify that operational goals and COGs establish the foundation for the selection of tactical objectives and the related COGs. When this inherent linkage to the strategic aims is not the dominant force in the planning process, operational and tactical considerations begin to determine strategy. Unfortunately, when this occurs, one is not performing operational art.

Mendel and Tooke based their methodology on the "hub of all power" definition for COG.[44] Their use of this definition is consistent with JP 3-0. However, their use of this particular definition still leaves unresolved the issue of where to begin in the selection of COGs.

WARDEN'S FIVE RINGS

Colonel John A. Warden III, US Air Force, wrote on identifying COGs in a paper titled "Strategic Warfare: The Enemy as a System."[45] He describes a model that, when used in conjunction with the Mendel-Tooke method, provides a solution to the problem of where to begin in the selection of COGs.

Warden's premise is that friendly, enemy, or other strategic entities (states, business, or terrorist organizations) are made-up of systems and subsystems.[46] He believes that the friendly objective is to do something to reduce the overall effectiveness of the enemy system, while at the same time taking necessary action to ensure the enemy does not damage the friendly system or any part of the subsystems.[47] The friendly entity attains its objectives by causing such changes to one or more parts of the enemy's physical system that he decides to adopt the friendly entity's objectives. The friendly entity can also make opposition physically impossible for the enemy (strategic paralysis).[48] Warden further states that determination as to which part of the enemy system to attack depends on the friendly entity's

objectives, the degree to which the enemy will resist, the enemy's capabilities, and the amount of physical, moral, and political effort the friendly entity is willing to expend.[49]

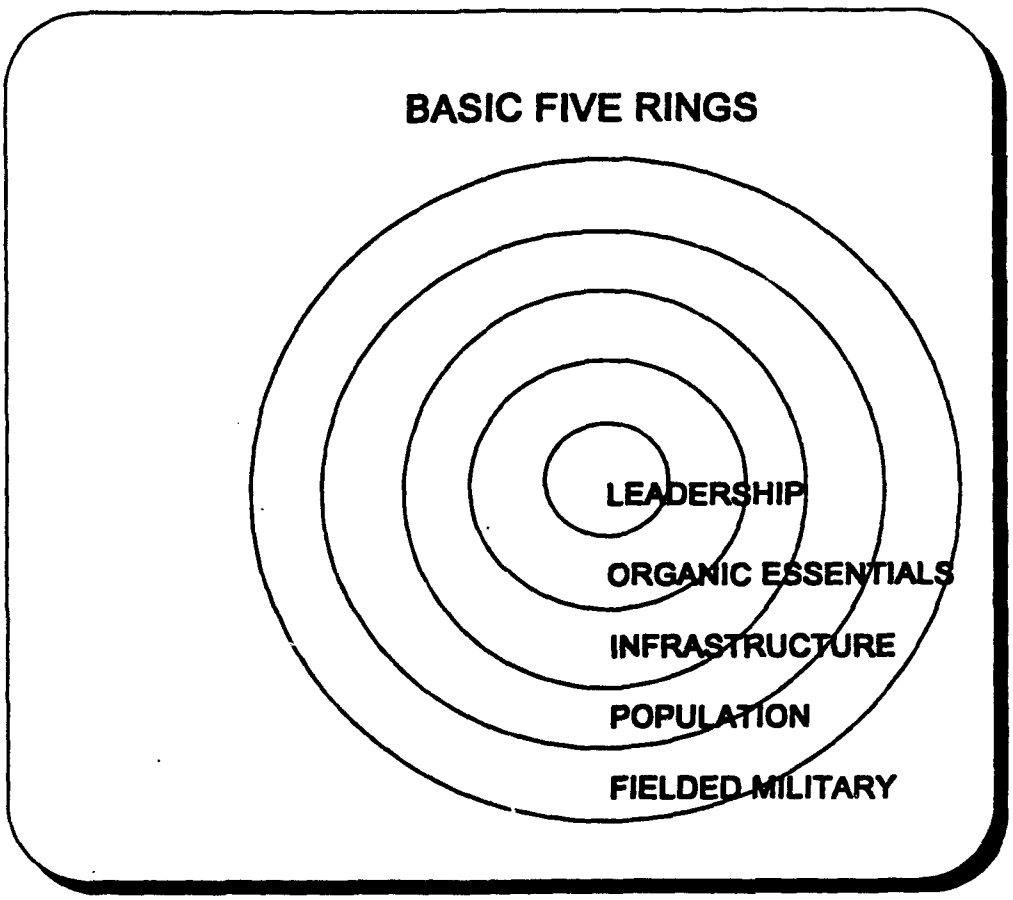

Figure 2.

Warden describes his Basic Five Rings Model (see Figure 2) as the starting point for selecting or identifying COGs.[50] This model tells us what detailed questions to ask and it suggests a priority for the questions and for operations: from the most vital at the center, to the least vital at the outside.

These COGs, which are also rings of vulnerabilities, are absolutely critical to the functioning of a state.[51]

The center is the place to start an examination of enemy systems. Warden's rationale is that all entities have some type of mechanism providing leadership or direction. Orbiting electrons receive their direction from the nucleus of an atom. In the biological world, the complex human brain and the nucleus of an amoeba provide direction. Within nations, those who provide this direction are its leaders, either of a part or the whole country. The leaders direct the functioning of the national subsystems and determine when to adopt (or not to adopt) a different set of objectives. Therefore, the leaders at the strategic (operational or tactical) level must be the figurative and sometimes literal target of the friendly entity's every action.[52]

In describing his model Warden uses the analogy of a strategic entitylikened to the human body. Starting with the center (the brain), he posits that Leadership or direction is the most essential component. He makes the case that, though the body may still be technically alive, without a viable functioning brain the body is incapable of performing. At the strategic level the center ring represents the enemy command structure (civilian head of government). This is the only element that can make concessions, make the complex decisions needed to keep a country on a particular course, or that can direct a country at war.[53]

At the operational level the center ring is the commander himself. He is the target of operations either directly or indirectly because he is the one who will decide to concede something to the enemy.[54] Included in this ring are his command, control, and communication systems. Without the ability to collect information and issue orders to his subordinates, the commander and his command are no longer capable of functioning at the strategic or operational levels.[55] However, the likelihood of physically seizing or paralyzing the center ring is remote. Therefore, one must look to the rings surrounding the leadership.

The second ring contains the Organic Essentials or vital organs (heart, lungs, liver) concerned with keeping the body alive. Organic essentials are those facilities or processes without which the state or organization cannot maintain itself. The brain cannot perform its strategic or operational functions if lacking the vital organs, and minus the brain, the vital organs do not receive the command they need to provide integrated support. Based on the discussion above, it would be tempting to attack the vital organs and leave the brain intact. This would be unwise as the brain could theoretically be kept alive and in communication with the outside world through a life support system.[56] Conversely, a heart without a brain lacks the capability to act or affect the environment. Strategically, electricity and petroleum products are the essential products for most states. The loss of these commodities makes life difficult, the state becomes incapable of employing

modern weapons and must make concessions.[57] Operationally, the organic essentials are analogous to logistics: ammunition, fuel, and food. Without logistics, a state cannot prosecute modern war.[58]

Bones, blood vessels, and muscles represent the Infrastructure. This ring contains the enemy's transportation system (the system which moves civil and military goods and services around the state's area of operations.) At the strategic level, rail lines, air routes, highways, bridges, airfields, ports, and a number of other similar systems are examples of infrastructure. The conduct of civil and military operations requires the movement of goods, services, and information from one point to another. If this movement is not possible, the state moves to a lower energy level and is less able to resist the enemy.[59] Operational level examples of infrastructure are roads, airways, seaways, rails, lines of communication, pipelines, and numerous other facilities needed to support the fielded military forces.[60]

The next most critical ring contains the Population (people), similar to the tens of millions of cells that carry food and oxygen around the body. Direct attack of the population is difficult due to the vast number of targets, and in many cases, the population may be willing to suffer a great deal before they turn on their government. An indirect attack is therefore more likely to be effective. Without the population, none of the three inner rings will function.

The last ring holds the body's protective system: its Fielded Military Forces. Their purpose is to protect the inner rings and to pose a threat to potential enemies.[61] Eliminating or reducing an entity's fielded military forces is one means to force it to make concessions. As a general rule, the resilient design of fielded military forces makes them hard to reduce. However, an attack against the fifth ring may be necessary in order to create the conditions for the attack of the other rings.

Having described his basic model, Warden uses two more models to further clarify his premise. The model at Figure 3 is similar to Figure 2, except that it shows a variety of subsystems in orbit about the center. Warden's point is that if the electrons move into a different orbit or

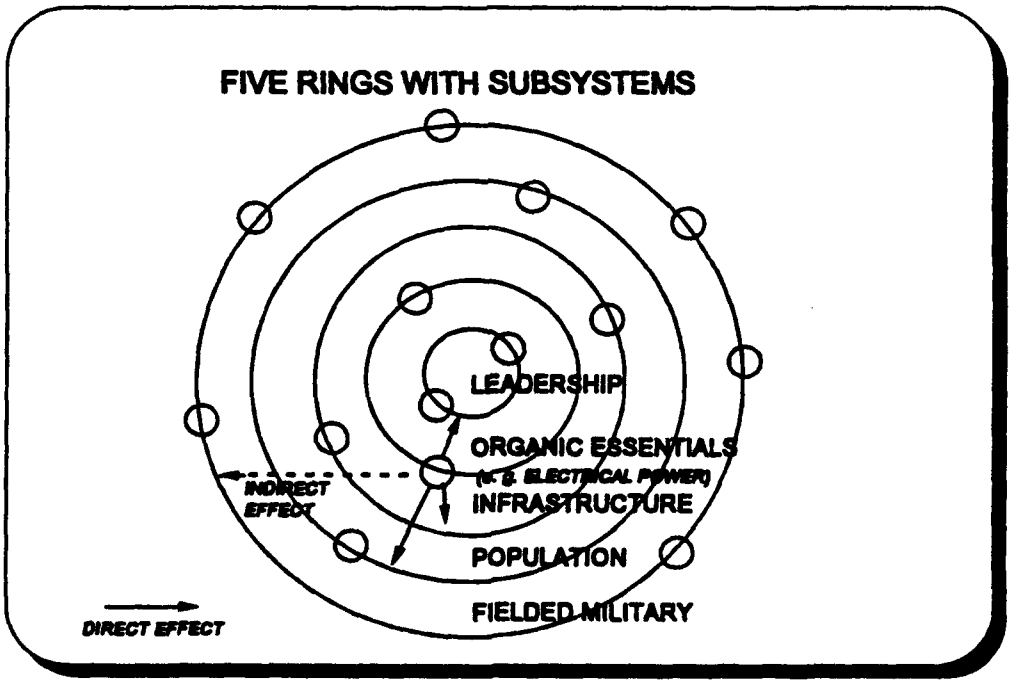

Figure 3.

disappear completely, then the atom changes its nature. It is instructive to note that Figure 3 reinforces the notion that an attack on one part of the system affects the overall system. Furthermore, though some parts of the system are more important than others, if any part of the system becomes incapable of functioning, other parts of the system will feel the effects.

Figure 4 is another variation of the Basic Five Rings Model. In this one, the circles have become ellipses. Warden's point with this model is to depict a dynamic system and to show that all systems are not going to have precisely the same relationship among the five rings.[62]

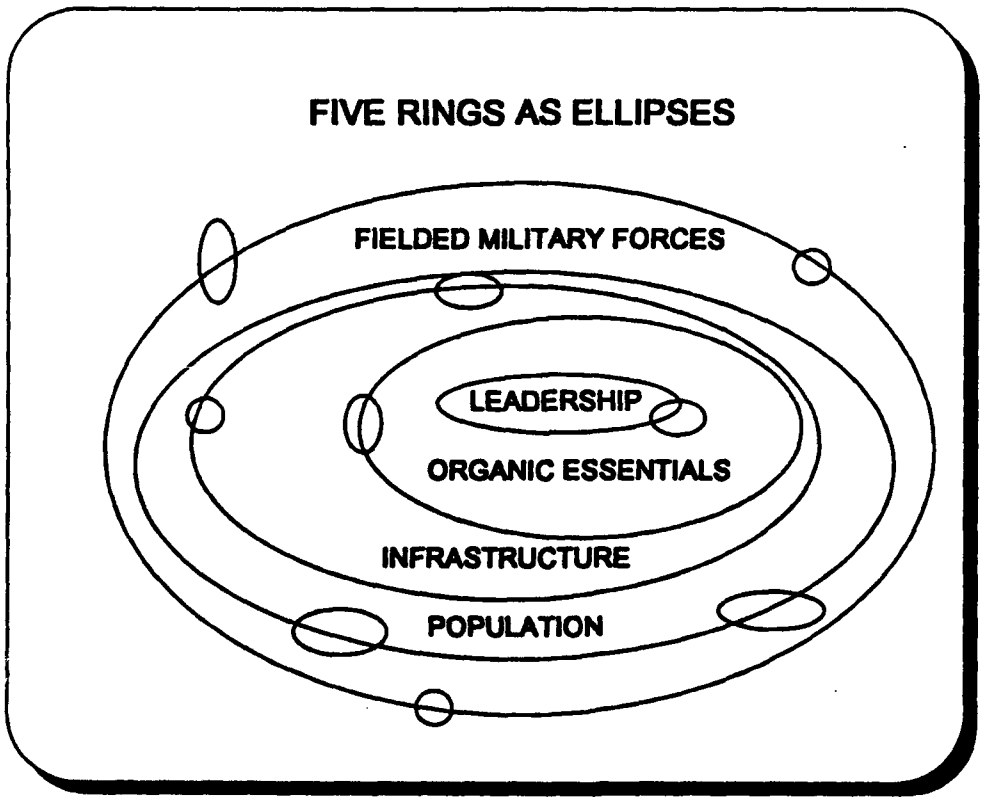

Figure 4.

Throughout his paper, Warden is clear to point out that the Five Rings provide a model for systems at a macro level. They also describe COGs for strategic and operational entities. Comparing Warden's methodology to that of Mendel and Tooke shows that there are two key conceptual differences. Mendel and Tooke provide a means to determine the validity of a possible COG while Warden does not. Warden offers tangible guidance on where to begin in terms of selecting a COG while Mendel and Tooke do not. A combination of the two approaches is a solution for identifying and selecting COGs.

V. DECIDE-DETECT-ATTACK (DDA) METHODOLOGY

The JFC's use of the Mendel-Tooke/Warden methodology corrects one of the problems noted in JP 5-00.1: identifying and selecting COGs. The next task would be to take this information and place it within a framework from which the JFC can effectively and efficiently synchronize the joint force's attack.

The US Army's Field Manual 6-20-10, Tactics, Techniques, and Procedures for The Targeting Process, provides a framework which tactical level commanders use to focus their combat power against specific targets. FM 6-20-10 defines a target as an enemy function, formation, equipment, facility, or terrain planned for capture, destruction, neutralization, or

degradation in order to disrupt, delay, or limit the enemy.[63] Targeting is the process of identifying enemy targets for possible engagement and determining the appropriate attack system to use to capture, destroy, degrade, or neutralize the target in question. The emphasis of targeting is identifying resources that the enemy can least afford to lose. Denying these resources strips the enemy of the initiative, forces him to conform to friendly battle plans, and places the friendly force in a position of advantage.[64]

TACTICAL LEVEL: DECIDE-DETECT-DELIVER (D^3)

The tactical targeting process consists of the intertwined Decide-Detect-Deliver (D^3) functions. FM 6-20-10 aims its discussion of the D^3 functions at the corps, division, brigade, and battalion levels.[65] These functions are also applicable to the operational level as the subsequent discussion will show. However, gaining an appreciation for the following terms is necessary for better understanding of the overall discussion:

- High-value Target (HVT): Assets the enemy needs to successfully complete his mission.

- High-Payoff Targets: HVTs that must be found and successfully attacked for the success of the friendly commander's mission.

- High-Payoff Target List (HPTL): A list of enemy targets that should be found and attacked.

- Collection Plan: Process that links acquisition and intelligence systems to locations and times in order to determine where and when targets should be found and who can find them.

- Attack Guidance Matrix (AGM): A matrix reflecting the commander's specific guidance on how to attack selected targets and the type of results he expects.[66]

Decisions made at the beginning of a tactical operation are critical to conducting the targeting process and are the basis of the D^3 methodology.[67] These decisions provide the guidelines for the acquisition and engagement of targets. Establishment of these guidelines at the beginning of the Decide function allows for a unity of effort and efficiency that is otherwise not achievable. The specific decisions made in this function answer the following:

- What targets should be acquired and attacked.
- Where and when the targets will likely be found and who can locate them.
- How and when the targets should be attacked.
- Whether target damage assessment is required.

In terms of products, the tactical commander communicates his answers to the above questions through the use of the high payoff target list (HPTL), collection plan and attack guidance matrix (AGM).

The tactical commander considers the enemy situation, his mission, the intent of his next two higher commanders, and the friendly concept of the operation in making his decision regarding the enemy commander's high value targets (HVTs). The tactical commander then identifies potential HVTs whose acquisition and attack contributes to the success of the friendly mission. He then Decides which HVTs he will attack and the priority for

their attack. He announces his decision by changing the status of selected targets from "HVTs" to "HPTs." The commander then collates his list of HPTs and disseminates them on the HPTL. The HPTL identifies the HPTs for a specific point in the battle in the order of their priority. While target value is usually the greatest factor contributing to target payoff, other things for consideration include:

- The sequence or order of occurrence.
- The ability to locate and identify the target.
- The degree of accuracy and identification available from the acquisition system.
- The ability to engage the target.
- The ability to defeat the target.
- The resources required to do all of the above.[68]

Another critical event in the Decide phase is the matching of attack options (maneuver, fires, electronic warfare, psychological operations, special operations forces or a combination thereof) and desired effects to the target. The commander begins this part of the process by expressing his desired effects in terms of delay, disrupt, or limit.[69] He next considers the ability of an attack system to achieve the desired effects. The result of this effort is the AGM which consists of columns for target categories, specific HPTs, time of target attack, method of target attack, and restrictions.[70]

One important point to remember is that the targeting process is not done in isolation. The tactical commander integrates the targeting process into the friendly concept of the operation. In doing so, he effectively and efficiently maximizes the use of all of his resources.

Detect is the next critical function in the targeting process. The intelligence system focuses its efforts on locating the HPTs designated in the Decide function. Target detection at the tactical level occurs by maximizing the use of all available intelligence assets (signals, imagery, and human).

The information gathered by the multitude of collection assets must be processed to produce valid targets. Not all of the information reported will be of benefit to the targeting effort, but it may be valuable to the development of the overall situation.[71] The intelligence system uses the detection priorities developed in the Decide function to expedite target information processing. As this information is processed, tasking of the appropriate attack systems occurs in accordance with the commander's guidance and the requirements of the attack system managers (e.g., Field Artillery, Attack Helicopters, etc.). Representatives from the intelligence community normally help the commander to develop of The HPTL. They provide advice as to the feasibility of locating the HPTs. Concurrently, they gain an appreciation for the collection priorities and lay the foundation for creation of the collection plan. Once the commander has approved the HPTL, the intelligence community completes its collection plan.

The Deliver function of the targeting process executes the target attack guidance and supports the commander's battle plan once the intelligence system locates and identifies the HPTs.[72] The attack of targets requires both tactical and technical decisions. Tactical decisions determine:

- The time of attack.
- The desired effects on the target.
- Which attack system to use.

Based on these tactical decisions, the technical decisions describe:

- The precise delivery means.
- The number and type of munitions.
- The unit to conduct the attack.
- The response time of the attacking unit.[73]

These decisions result in the physical attack of the targets by lethal and/or nonlethal means.

Target damage assessment determines if the results of a target's attack met the commander's guidance. If the results do not meet the commander's guidance, then the entire targeting process must continue focusing on reattacking the target until achievement of the commander's guidance.[74]

In sum, the commander made several decisions throughout the targeting process. He determined what assets (targets) the enemy commander needed to be successful (HVT). The tactical commander then determined which HVTs, if attacked, could contribute to the success of the

friendly mission. He designated these targets as HPTs and placed them on the HPTL. The commander articulated his collection priorities from which the intelligence system developed a collection plan to locate the HPTs. For each HPT, the commander stated his attack guidance in terms of desired effects. Once the intelligence system located an HPT, attack systems engaged the target in accordance with the commander's guidance as specified on the AGM. Damage assessment then determined if the target warranted further attack. Lastly, to optimize the use of his assets, the commander ensured integration of the targeting effort with his overall concept of the operation.

OPERATIONAL LEVEL: DECIDE-DETECT-ATTACK (DDA)

Throughout the process the tactical commander considered how to integrate the effects and results of targeting with that of his overall concept of operations. Integrating targeting with the concept of the operation provides the tactical commander with the means to achieve the most efficient and effective use of his resources. Conceptually, the operational level commander (JFC) could follow the same process, use the same tools, and achieve similar results. The key difference would be that instead of focusing on specific targets, the JFC would orient on the center(s) of gravity. The JFC does this by using the combined Mendel-Tooke/Warden/D^3 (hereinafter referred to as the Decide-Detect-Attack) methodology. Additionally, use of

the D^3 portion of the DDA methodology requires the JFC to substitute the word "attack" for "deliver" and the term "COG" for the word "target":

- What are the COGs that we should acquire and attack.

- Where are the COGs and who can locate them.
- How and when should the COGs be attacked.

- How do we determine if our attack on the COG was successful.

Like the tactical commander, the operational level commander could use the HPTL, collection plan, and AGM.

In the Decide function the JFC would consider the strategic political objectives, military objectives, his mission, and the intent of his next higher commander(s). He then would attempt to identify enemy COGs for attack and friendly COGs for protection using the Mendel-Tooke/Warden portion of the DDA methodology. He Decides which COGs he will attack and the priority for their attack. The JFC could disseminate this information using a list similar to the HPTL or in the campaign plan format discussed in JP 5-00.1.[75]

The next decision the JFC would make is to match attack options and desired effects to a COG. Whereas the tactical commander expressed his desired effects in terms of delay, disrupt or limit, the JFC should consider the addition of terms more closely related to types of damage, such as destroy or neutralize. This would allow the JFC more flexibility as he generally has

more direct control over his assets than the tactical commander. The JFC also focuses on attacking things other than enemy troop formations and their supporting systems. In terms of attack assets, the JFC the same options as the tactical commander: fires, maneuver, special operations forces, or a combination thereof. Together with the military instrument of power, the JFC could also use the economic, diplomatic, and informational (media) instruments as "attack" assets to leverage COGs. The result from this effort would be the production of something similar to the AGM where the JFC could specify the COGs, time of attack, method of attack, and restrictions. Also, whereas the focus of the AGM at the tactical level was to provide guidance for specific weapon systems, the focus at the operational level is to define the tasks and purpose for each of the joint force's capabilities.

Tactical action between opposing forces requires the presence of certain conditions. For example, the opposing forces are close enough in either time or space to make the likelihood of combat a concern. From this one could infer that the tactical commander's role is in creating conditions that facilitate combat. The same holds true for the JFC, except he focuses more on creating the conditions that support campaigns or major operations. Establishment of these conditions within the framework of the DDA process requires integration of the concepts of operational design.

Lines of operations are important at the operational level. Not only do they define the friendly force's directional orientation, but they also define

locations for possible combat operations that will create the conditions for attacking COGs. For instance, the location of a line of operation defines where the joint force must secure air and sea lines of communication. Implicit within these tasks is the establishment of air and/or maritime superiority. Lines of operations also connect the joint force to its base of operations. Location of the base of operations also determines where the joint force must establish air or maritime superiority.[76] Other concepts that would be of value in the establishment of parameters for operational level warfare are culmination, decisive points, and arranging operations.

Culmination refers to that point where a force reaches its peak effort in generating combat power to conclude a successful operation, and whereby the overextension of this effort could lead to defeat.[77] Consideration of the concept of culmination induces the operational commander to determine if he wants to attack or defend. It also helps gauge when his logistical system can no longer sustain operations. The concept of culmination affects the commander's determination of what COGs he is capable of striking.

Decisive points are either geographic or physical points whose control or neutralization provides the joint force with a marked advantage over the enemy. JP 5-00.1 states that identifying and attacking decisive points is key to targeting the enemy's COG. Normally, there are numerous decisive points in an operational area. Therefore, the JFC must analyze and prioritize these points to determine which are most conducive to the destruction of enemy

COGs.[78] In those cases where direct attack is not feasible, the JFC indirectly attacks the COG. He does this by attacking decisive points, knowing that an impact on one part of the enemy system will cause a change in composition of the whole.

The last concept used during the Decide phase of the DDA methodology is that of arranging operations. The JFC visualizes a combination of simultaneous and sequential operations necessary to achieve desired conditions of the end state. Proper arrangement also helps determine the tempo of activities in time and space. This process is useful when determining phases, applying resources, and enabling the JFC to visualize the requirements for subsequent operations. Regarding the Decide function, arranging operations is the key factor in determining when to attack COGs. Taken into consideration with lines of operation, culmination, and decisive points, this concept helps the Decide function come to closure on the issue of timing with regard to attacking COGs.

The Detect function at the operational level is the part of the process by which the JFC articulates his intelligence acquisition priorities based on the decisions made in the Decide phase. As mentioned earlier, not all of the information collected will directly relate to COGs. However, some of this information could be useful in identifying and locating decisive points and obtaining freedom of maneuver for the joint force (air/maritime superiority). As this information is processed the intelligence system provides the

appropriate joint force capability with the information needed to accomplish its tasks. The product used at the operational level for this effort is the collection plan.

Substituting the word Attack for the word Deliver at the operational level more aptly describes the role of this particular function. The focus of the deliver function at the tactical level was to provide attack guidance for specific weapon systems. At the operational level, the commander is not as concerned about specific weapon systems. At this level he is more concerned with specific capabilities. Therefore, at the operational level, the emphasis is on attacking the COG with the appropriate force capability vice weapon system. Additionally, the tactical level focuses on making both tactical and technical decisions for specific weapon systems. The operational level focuses on establishment of the conditions for an attack, determining the sequence and time of an attack, the desired effects, and selection of the appropriate joint force capability from which to execute the commander's guidance.

As shown in Figure 4, an attack of enemy COGs transforms the nature of the enemy system and the relative importance of any COG. This indicates that the intelligence system must continually monitor COGs and determine if they warrant further attack.

One point made in the tactical level discussion is that the targeting process is not done in isolation. The tactical commander makes a concerted effort to integrate the targeting process with his concept of operations. A

noteworthy difference found in the DDA methodology is that integration of the "targeting process" and concept of operation occurs from the beginning; a seamless relationship. The overarching concept is maximizing the use of the joint force's assets should not occur by developing and joining two different processes. Rather, it is more important that to integrate the two from the beginning in order to achieve a fully developed and self-synchronizing process.

VI. CONCLUSIONS

Clausewitz's concept of center of gravity as defined in joint doctrine provides the focal point or *Schwerpunkt* for campaign design. Warden's Five Rings Model provides the start point from which to identify centers of gravity. Filtering the selected center of gravity through the model developed by Mendel and Tooke helps the JFC to objectively determine their validity and feasibility for attack. The tactical level targeting process, modified to meet operational level requirements, provides a means from which to synchronize the joint force's attack. However, instead of preparing two separate products (targeting and concept of the operation), the operational commander uses the targeting methodology as the foundation for his concept of the operation and campaign plan design. By integrating the elements of the Decide-Detect-Attack functions along with the elements of operational

design, the JFC would be able to clearly communicate: his concept of the operation, his intent, and his initial planning guidance with respect to COG priorities. This information will allow the staff and subordinates to begin planning with a clear picture of the priorities that apply to the following:

- The tasking of intelligence acquisition assets
- Information processing
- Selection of the best joint attack capability.
- Requirements for post attack assessment.[79]

Use of the combined Mendel-Tooke/Warden and D^3 methodologies, now referred to as the Decide-Detect-Attack Methodology, offers the JFC a framework from which to focus the joint force's attack. By using this methodology, the JFC can establish the conditions necessary for full exploitation of the joint force's capabilities against the enemy center of gravity.

Adding the DDA Methodology to the joint tactics, techniques, and procedures set forth in JP 5-00.1 will provide the JFC a comprehensive process from which to conduct campaign planning. The implications of including the DDA Methodology would be transparent to each of the services. That is, their fundamental approach to thinking about warfare would not change. What does change is the way in which the JFC approaches the design of campaigns. Instead of subjectively determining enemy centers of gravity and designing campaign plans based on fallacious

grounds, the JFC now has a methodology from which to effectively align capabilities to results, ends to means, and strategy to tactics.

[1] Joint Staff, Joint Pub 1, Joint Warfare of the US Armed Forces, p. 46. Chapter II of this monograph will discuss Clausewitz's center of gravity concept in greater detail (Reference: Carl von Clauswitz, On War. Ed. and Trans. Michael Howard and Peter Paret, (New Jersey: Princeton University Press, 1976) pp. 248, 485-7, 595-597.

[2] Joint Staff, Joint Pub 3-0, Doctrine for Unified and Joint Operations (Test Pub), p. xii, defines operational art as: The employment of military forces to attain strategic or operational objectives in a theater of war through the design, organization, and conduct of campaigns and major operations. Operational art translates theater strategy into operational and ultimately tactical action.

[3] Joint Chiefs of Staff, Joint Pub 5-00.1, Joint Tactics, Techniques, and Procedures for Campaign Planning (Revised Initial Draft), pp. II-1, II-2.

[4] Joint Pub 3-0's definition for joint force commander is: a general term applied to a commander authorized to exercise combatant (command authority) command or operational control over a joint force. Also called JFC, p. xi.

[5] Joint Pub 5-00.1, p. II-2.

[6] William J. A. Miller, "The Evolution of Operational Art: A Neverending Story," (Ft Leavenworth, KS), p.4.

[7] Joint Pub 5-00.1, p. II-2 explains the key concepts of operational design.

[8] Ibid, p. II-3.

[9] Ibid, p. III-20.

[10] Ibid, IV-17 to IV-45 list the following actions as necessary to implement the campaign plan. Those areas specifically discussing the attack of enemy centers of gravity are in italics.

Planning actions: Pre-hostilities.

- *Intelligence preparation of the theater to identify potential enemy centers of gravity.*
- Identify the infrastructure to deploy and support combat operations.
- Train and organize the joint force.
- *Pre-conflict use of special operations forces to provide operational leverage.*
- Protect the force and freedom of action by forming alliances, both official and unofficial, in the region.
- Isolate the enemy to deprive it of outside support or sanctuaries.
- *Position the force within operational reach of centers of gravity.*
- Exploit the control of space.

Planning actions: Initiation of Hostilities.

- Exploit full dimensional leverage.

- Sequence, enable, and protect the arrival of the force.
- Secure air and maritime security.
- Secure C^4I superiority.
- *Attack enemy strategic centers of gravity to gain further decisive advantage early. The JFC should attack deep enemy strategic centers of gravity. Deep-ranging capabilities such as air, missiles, and SOF may be used for the strategic targets.*
- *Conduct enhanced SOF operations to directly or indirectly attack enemy centers of gravity.*
- Synergize the use of deception, psychological, and civil affairs operations.

Planning actions: Sustained Operations.

- *Conduct extensive use of maneuver to gain positional advantage relative to enemy centers of gravity.*
- Conduct extensive interdiction operations.
- Synchronize the maneuver and interdiction efforts.
- Ensure effective control and coordinating measures.
- Ensure proper force apportionment.
- Utilize joint precision interdiction.
- Conduct effective targeting.
    - Conduct battle damage assessment (BDA) operations.

Planning actions: Pre-Termination.

- Assess status of objectives.
- Ensure successful outcome.
- Realign the joint force structure.
- Determine requirements for changing C2 structure.

Planning actions: Post-Termination.

- Transition to civil authorities.
- Support post-termination truce negotiations.
- Continue directed special operations activities.
- Public affairs operations.
- Redeployment.

11 Clausewitz was the son of a retired Prussian Army officer. He entered the Prussian Army as a cadet at the age of 12 in 1780. One year later Clausewitz fought in the War of the First Coalition against France, 1793-1794. It was during this war that he received his officer's commission. In 1803, Clausewitz graduated from the top of his class at the Military School of Berlin. He then became the Aide to Prince August of Prussia. Clausewitz fought again in 1806 in the Jena Campaign where he was captured by the

French. After the war, Clausewitz assisted in the reorganization of the Prussian Army. He also taught at the Prussian Military School and was assigned as the Military Instructor of Frederick William IV, Crown Prince of Prussia. In 1812 Prussia aligned with France against the Russians. Clausewitz saw this as traitorous and as a result resigned his commission to join the Russian Army. He served with the rear guard covering the Russian retreat and later in the pursuit of Napoleon. He served as a liaison officer during the campaign of 1813 and Corps Chief of Staff during 1814. Clausewitz reentered the Prussian Army in 1815. In the Waterloo Campaign of 1815, Clausewitz served as Corps Chief of Staff. Clausewitz did most of his writing from 1815-1830 while a Major General and Director of Administration at the Prussian War School. He stopped writing in 1830 upon his transfer to the artillery and assignment as Army Chief of Staff. He died in 1831 at the age of 51.

His major writings consisted of seven books published by his widow after his death. These books are: On War, The Italian Campaign (1796-1797), The Campaigns of Switzerland and Italy, 1799, The Wars of 1812, 1813, and 1814, The Waterloo Campaign, and two volumes describing several campaigns conducted by leading generals and strategists. His most important work has been On War. In it, Clausewitz developed his theory of war. In developing his theory of war, Clausewitz originated the military usage of the term "center gravity." Source for biography is John R. Bozeman, "Carl von Clausewitz," Military Strategists: Past and Present (1992), pp. 17-21.

[12] The author selected Clausewitz's interpretation of the concept of center. Clausewitz's writings in On War are the source from which all contemporary writers base their interpretations of center of gravity. Notably, the interpretations of Dr. James J. Schneider and Lawrence L. Izzo. Their works, while prescient, represent nothing more than other interpretations. However, their views are interesting and are worthy of reading: Schneider, James J. and Lawrence L. Izzo. "Clausewitz's Elusive Center of Gravity," Parameters (September, 1987): 46-57 and Lawrence L.Izzo, "The Center of Gravity is Not an Achilles Heel," Military Review (January, 1988): 72-77. At the time of publication of these articles, Dr. Schneider was a professor of military theory at the School of Advanced Military Studies, Command and General Staff College, Fort Leavenworth, Kansas. He holds bachelor's and master's degrees from the University of Wisconsin, Oshkosh. He served as a tank commander with the 1st Infantry Division in Vietnam and as an operations research analyst with the US Army Combined Arms Operations Research Activity, Fort Leavenworth.

Lawrence L. Izzo was also a faculty member at the School of Advanced Military Studies. He is a graduate of the US Military Academy and holds an M.S. in nuclear engineering from Massachusetts Institute of Technology and an M.B.A. form Long Island University. He has served in Vietnam and Germany and commanded the 82d Airborne Division's

engineer battalion during Operation Urgent Fury in Grenada. Source for both biographies is Parameters (September, 1987), p. 47.

[13] Clausewitz, p. 248.

[14] Ibid, p. 485; Steven Metz and Frederick M. Downey, "Centers of Gravity and Strategic Planning," Military Review (April, 1988), p. 23.

[15] Ibid, p. 485-6.

[16] Ibid, p. 487.

[17] Ibid, p. 486.

[18] Ibid, p. 595-6.

[19] Ibid, p. 596.

[20] Ibid, p. 596.

[21] Michael T. Inman, "The Tactical Center of Gravity: How Useful is the concept?" (Fort Leavenworth, KS, 1991), p. 5, quoting Frederick W. C. Lieder, Ph. D. and Ray Waldron Pettengill, Ph. D, Manual of Military German, (Cambridge: Harvard University Press, 1918) pp. 329 and 337.

[22] Inman, p. 5, quoting Dr. Otto Springer, Ed., *Langenscheidt New Murat-Sanders Encyclopedic Dictionary of the English and German Languages*, (Berlin: Langenscheidt, 1974).

[23] James M. Dubik, "A Guide to The Study of Operational Art and Campaign Design: A Draft Suggestion, (Fort Leavenworth, KS), p.14.

[24] Ibid, p. 14.

[25] Ibid, p. 14.

[26] Department of the Army, Field Manual 100-5, Operations, (1993), pp. 6-7, Glossary 1.

[27] Ibid, p. 6-7.

[28] Ibid, p. 6-7.

[29] Department of the Air Force, Air Force Manual 1-1, Basic Aerospace doctrine of the United States Air Force, pp. 46, 151.

[30] Ibid, p. 151.

[31] AFM 1-1, p. 151 quoting John A. Warden III, The Air Campaign, Winning for Combat, (Washington DC: National Defense University, 1988), p. 41.

[32] AFM 1-1, p. 151 quoting Warden, pp. 54, 58-59.

[33] AFM 1-1, p. 275 and Joint Pub 3-0, p. ix.

[34] Admiral James D. Watkins, "The Maritime Strategy," supplement to US Naval Institute Proceedings (January, 1986), p. 4.

[35] United States Marine Corps. Fleet Marine Force Manual 1 (FMFM), Warfighting, (Washington DC: Department of the Marine Corps, 1989), pp. 59-60.

[36] Ibid, p. 85.

[37] Ibid, p. 29.

[38] Ibid, p. 74.

[39] Joint Pub 3-0, p. iii.

[40] Ibid, p. iii.

[41] Clausewitz, p. 596.

[42] William W. Mendel and Lamar Tooke, "Operational Logic: Selecting the Center of Gravity," Military Review 73 (June, 1993): 2-11.

[43] Ibid, p. 5.

[44] Ibid, p. 6.

[45] John A. Warden III "Strategic Warfare: The Enemy as a System. Unpublished Document. Air Command and Staff College, January, 1993.

[46] Ibid, p. 4. Warden wrote that strategic entities are really the subject matter with a nation-state being a type of strategic entity. A strategic entity is any organization that can operate autonomously; that is, it is self-directing and self-sustaining. A state is a strategic entity as is a criminal organization like the Mafia or business organization like General Motors. Conversely, neither an army nor an air force is a strategic entity because they are neither self-sustaining nor self-directing. This is an important distinction in itself. Of most importance here, however, is that our discussion of strategic centers and strategic warfare is as applicable to a guerilla organization, and modern industrial state.

[47] Ibid, p. 31.

[48] Ibid, p. 4.

[49] Ibid, pp. 4-5.

[50] Ibid, p. 15.

[51] Ibid, p. 15.

[52] Ibid, p. 5.

[53] Ibid, p. 15.

[54] Ibid, p. 22.

[55] Ibid, p. 22.

[56] Ibid, p. 6.

[57] Ibid, p. 16.

[58] Ibid, p. 19.

[59] Ibid, p. 17.

[60] Ibid, p. 23.

[61] Ibid, p. 18.

[62] Ibid, p. 10.

[63] Department of the Army, Field Manual 6-20-10, Tactics, Techniques, and Procedures for The Targeting Process, (1990), p. 1-1.

[64] Ibid, p. 1-1.

[65] Ibid, p. 1-5.

[66] Ibid, pp. 2-4 to 2-8.

[67] Ibid, p. 2-1.

[68] Ibid, p. 2-5.

[69] Ibid, p. 4-3.

[70] Ibid, p. 2-8.

[71] Ibid, p. 1-4.

[72] Ibid, p. 4-1.

[73] Ibid, p. 4-1.

[74] FM 6-20-10, p. 1-4.

[75] Joint Pub 5-00.1, p. A-3.
[76] Ibid, p. II-5.
[77] Ibid, p. II-5.
[78] Ibid, p. II-7.
[79] FM 6-20-10, p. 1-4.

BIBLIOGRAPHY

BOOKS

Clausewitz, Carl von. On War. Ed. and Trans. Michael Howard and Peter Paret. Princeton, New Jersey: University Press, 1976

Cushman, John H. Thoughts for Joint Commanders. Annapolis, Maryland: August, 1993.

Leonhard, Robert R. The Art of Maneuver: Maneuver-Warfare Theory and Airland Battle. Novato, CA: Presidio Press, 1991.

Van Crevald, Martin L. Command In War. Massachusetts: Harvard University, 1985

Warden, John A. III. The Air Campaign, Winning for Combat. Washington DC: National Defense University, 1988.

Wolk, Herman S. Editor. Air Campaign Planning. Washington DC: Office of Air Force History, 1990

GOVERNMENT PUBLICATIONS

Armed Forces Staff College. AFSC PUB 2, Service Warfighting Philosophy and Synchronization of Joint Forces. Norfolk, VA: National Defense University, August 1992.

Joint Staff. Joint Pub 1, Joint Warfare of the US Armed Forces. Washington DC: United States Government Printing Office, 11 November, 1991.

Joint Staff. Joint Pub 3-0, Doctrine for Unified and Joint Operations (Test Pub). Washington DC: United States Government Printing Office, January, 1990.

Joint Staff. Joint Test Pub 5-0, Doctrine for Planning Joint Operations. Washington DC: United States Government Printing Office, 26 July 1991.

Joint Chiefs of Staff. Joint Pub 5-00.1, Joint Tactics, Techniques, and Procedures for Campaign Planning. Washington DC: United States Government Printing Office, August 1993.

United States Air Force. Air Force Manual 1-1, Volume I & II, Basic Aerospace Doctrine of the United States Air Force. Washington DC: Department of the Air Force, March 1992.

United States Army. Field Manual 6-20, Fire Support in the AirLand Battle. Washington DC: Department of the Army, May 1988.

United States Army. Field Manual 6-20-2, Tactics, Techniques and Procedures: Corps Artillery, Division Artillery, and Field Artillery Brigade Headquarters. Washington DC: Department of the Army, Jan 1993.

United States Army. Field Manual 6-20-10, Tactics, Techniques and Procedures: The Targeting Process. Washington DC: Department of the Army, March 1990.

United States Army. Field Manual 100-5, Operations. Washington DC: Department of the Army, 1993.

United States Army. TRADOC Pam 11-9, Blueprint of the Battlefield. Fort Monroe, Virginia: Headquarters, United States Army Training and Doctrine Command, April 1990.

United States Army. Student Text 100-9, The Tactical Decisionmaking Process. Fort Leavenworth, Kansas: Command and General Staff College, July 1993.

United States Marine Corps. Fleet Marine Force Manual 1, Warfighting. Washington DC: Department of the Marine Corps, 1989.

United States Marine Corps. Fleet Marine Force Manual 1-1, Campaigning. Washington DC: Department of the Marine Corps, 1990.

PERIODICALS AND ARTICLES

Bozeman, John R. "Carl von Clausewitz," Military Strategists: Past and Present (1992): 17-21.

Izzo, Lawrence L. "The Center of Gravity is Not an Achilles Heel." Military Review (January, 1988): 72-77.

Mendel, William W. and Lamar Tooke. "Operational Logic: Selecting the Center of Gravity." Military Review 73 (June, 1993): 2-11.

Mendel, William W. and Floyd T. Banks. "Campaign Planning: Getting It Straight," Parameters (September, 1988): 43-53.

Mendel, William W. and Floyd T. Banks. "Theater Strategy and the Theater Campaign Plan: Both Are Essential," Parameters (December, 1988): 42-48.

Metz, Steven and Frederick M. Downey. "Centers of Gravity and Strategic Planning." Military Review (April, 1988): 22-33.

Schneider, James J. and Lawrence L. Izzo. "Clausewitz's Elusive Center of Gravity." Parameters (September, 1987): 46-57.

Warden, John A. III. "Employing Airpower in the 21st Century." Excerpted from "The Future of Airpower in the Aftermath of the Gulf War," (July 1992): 81-95.

Watkins, Admiral James D. "The Maritime Strategy." Supplement to US Naval Institute Proceedings (January, 1986), p. 4.

THESES, MONOGRAPHS, AND UNPUBLISHED DOCUMENTS

Agee, Collin A. "Peeling the Onion: The Iraqi Center of Gravity in Desert Storm." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1992.

Allen, C. D. "Operational Design of Campaigns. A Hedge against Operational Failures." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1990.

Baggott, C. L. "Achieving the Operational End-State: The Linkage of Military Operations with Regional Strategy." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1991.

Brisson, Douglas D. "Campaign Plans, Military Strategy, and Policy Objectives: The Imperative for Linkage in U.S. Defense Planning." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1988.

Crain, W. F. "Heart of Operational Art: Translating Strategic Objectives into Tactical Missions." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1990.

Culbertson, C. N. "Air Intelligence and the Search for the Center of Gravity." Report. Maxwell Air Force Base, Alabama: Air War College, April 1988.

Donahue, P. E. "Does FMFM 1-1 Provide Adequate Guidance to Understand Campaign Planning." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1992.

Dubik, James M. "A Guide to The Study of Operational Art and Campaign Design: A Draft Suggestion. School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, Unpublished paper, 1991.

Estilow, Rex A. "Campaign Planning: The Search for Method." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1992.

Filiberti, Edward J. "Developing a Theory for Dynamic Campaign Planning." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1988.

Flanigan, David B. "The Operational Operating Systems as an Analytical Tool: A Look at the 1862 Peninsula Campaign." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1992.

Gardner, Gregory C. "Generalship in War: The Principles of Operational Command." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1987.

Gilbert, Terence L. "In Search of Jointness: The Air Force Officer As Operational Artist." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April, 1988.

Goehring, Russell J. "Sequencing Operations: The Critical Path of Operational Art." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1987.

Griswold, Myron J. "Considerations in Identifying and Attacking the Enemy's Center of Gravity." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1986.

Hartling, Mark P. "Insights Garnered and Gained: Military Theory and Operation Peace for Galilee." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1987.

Heredia, M. D. "Peacetime Campaign Planning Versus the Realties of Combat, the Need for an Operational Mechanism." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1988.

House, J. M. "Do Doctrinal Buzzwords Obscure the Meaning of Operational Art." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1989.

Inman, M. T. "Tactical Center of Gravity: How Useful is the Concept." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, January 1990.

Johnson, J. D. "Sequencing Operations: Considerations for the Operational Planner." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1991.

Johnson, K. D. "Intelligence Preparation of the Theater." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1991.

Jussell, P. C. "Operational Implications of Pivots of Maneuver." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, September 1991.

Kalb, John F. "A Foundation for Operational Planning: The Concepts of Center of Gravity, Decisive Point, and the Culminating Point." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1987.

Kelly, Patrick. "Modern Scientific Metaphors of Warfare: Updating the Doctrinal Paradigm." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1993.

Korosec, B. M. "Analytic Hierarchy Process: Enhancing Operational Level Decision Making." Report. Newport, Rhode Island: Naval War College, March 1993.

Kriwanek, Thomas M. "The Operational Center of Gravity." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1986.

Lynch, T. D. "Operational Synchronization: A Revised Doctrinal Perspective." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1990.

Marks, James A. "In Search of the Center of Gravity: Operational Intelligence Preparation of the Battlefield." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1990.

Melody, Paul E. "The Principles of War and Campaign Planning: Is There a Connection." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1990.

Mendel, Bill. "An Operational Art Overview." US Army Slide Presentation and Script, US Army War College, Carlisle Barracks, PA, Unpublished, 1991.

Mendel, William W. and Floyd T. Banks Jr. "Campaign Planning." Strategic Studies Institute, US Army War College, Carlisle Barracks, PA, 1988.

Mendel, William W. "The Campaign Planning Process." Paper, US Army War College, Carlisle Barracks, PA, 1991.

Miller, William J. A. "The Evolution of Operational Art: A Neverending Story." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1993.

Richmond, Melvin E. "Communist Insurgencies and the Relevance of the Concepts of Center of Gravity and Decisive Points." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1988.

Saxman, John B. "The Concept of Center of Gravity: Does it Have Utility in Joint Doctrine and Campaign Planning." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1992.

Schmader, J. R. "Center of Gravity: The Critical Link in Strategic Planning for Low Intensity Conflict. Study Project. Carlisle Barracks, Pennsylvania: US Army War College, February 1993.

Schmidt, Thomas. "The Military-Political Linkage in Coalition Warfare: A Korean Case Study." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1988.

Schneider, James, J. "The Theory of Operational Art." Theoretical Paper No. 3, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, March 1988.

Stallings, Patrick A. "What To Do, What To Do. Determining a Course of Action at the Operational Level of War." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1992.

Strain, P. M. "Tactical Center of Gravity: Fact or Fallacy." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, December, 1992.

Swan, R. P. "Pieces of a Military Chessboard. What is the Contemporary Significance of Jomini's Design of a Theater of Operations." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1991.

Van Hook, G. E. "Environment as an Operational Center of Gravity." Report. Newport, Rhode Island: Naval War College, February 1993.

Vanderbeek, Walter A. "The Decisive Point: The Key to Victory." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, April 1988.

Viale, C. R. "Conversation at the Club: Another Analysis of the Concept of Center of Gravity." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, February 1988.

Warden, John A. III "Strategic Warfare: The Enemy as a System. Unpublished Document. Air Command and Staff College, January, 1993.

Zanoi, J. E. "Smaller, More Lethal Force: Operational Art by an Outnumbered Army." Monograph, School of Advanced Military Studies. Fort Leavenworth, KS, US Army Command and General Staff College, May 1991.