

Center of Gravity or Center of Confusion

Understanding the Mystique

Seow Hiang Lee

Major, Republic of Singapore Air Force

Air Command and Staff College

Wright Flyer Paper No. 10



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Lance W. Lord, Lt Gen, Commander

Air Command and Staff College

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Cover Design: Daniel Armstrong

Please send inquiries or comments to:
Editor

The Wright Flyer Papers
Air Command and Staff College (ACSC/DER)
225 Chennault Circle Bldg 1402
Maxwell AFB AL 36112-6426
Tel: (334) 953-2308
Fax: (334) 953-2292
Internet: Stuart.Kenney@maxwell.af.mil

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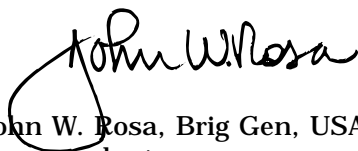
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Foreword

It is my great pleasure to present another of the *Wright Flyer Papers* series. In this series, Air Command and Staff College (ACSC) recognizes and publishes the “best of the best” student research projects from the prior academic year. The ACSC research program encourages our students to move beyond the school’s core curriculum in their own professional development and in “advancing aerospace power.” The series title reflects our desire to perpetuate the pioneering spirit embodied in earlier generations of airmen. Projects selected for publication combine solid research, innovative thought, and lucid presentation in exploring war at the operational level. With this broad perspective, the *Wright Flyer Papers* engage an eclectic range of doctrinal, technological, organizational, and operational questions. Some of these studies provide new solutions to familiar problems. Others encourage us to leave the familiar behind in pursuing new possibilities. By making these research studies available in the *Wright Flyer Papers*, ACSC hopes to encourage critical examination of the findings and to stimulate further research in these areas.

A handwritten signature in black ink that reads "John W. Rosa". The signature is written in a cursive style with a large, looping initial "J".

John W. Rosa, Brig Gen, USAF
Commandant

Preface

My interest in the center of gravity (COG) concept began in the Republic of Singapore when I noticed with some amusement that a concept which purports to help campaign planners focus their main effort can be embroiled in such controversy and confusion. While attending the Air Command and Staff College (ACSC), I witnessed how the same paradoxes dominated seminar discussions. In one instance, when we were asked to determine the COGs of a certain historical campaign—all given the same set of background documents, there were as many disagreements generated as there were assigned groups. A cursory check with other seminar instructors revealed that the same pattern prevailed across the seminar groups. Was this evidence of the creativity of ACSC students, or are the underlying conceptions of the COG so dissimilar that people are talking across each other without even realizing it? I attempt to unravel some of the mystique that surrounds the employment of the COG concept. Hopefully, by drawing out the potential sources of confusion that often accompany the use of the concept, we can soften the difficulties of communication and shift the focus of our arguments in a direction that will be more profitable to all.

I am indebted to Dr. Richard R. Muller for his encouragement and invaluable advice. Special thanks to Lt Col Christopher Cook and my ACSC colleagues, especially Maj Patricia Hoffman, for their insightful comments and patience in putting up with more Clausewitzian stuff than they would otherwise choose. I, however, remain solely responsible for any shortcomings that prevail.

Abstract

Despite its crucial role in campaign planning, the center of gravity (COG) concept remains poorly understood and inconsistently applied. This research paper seeks to understand the common sources of confusion that can occur when the COG concept is employed. It investigates the extent to which these inconsistencies can be resolved and the implications for the employment of the concept when these inconsistencies persist.

To address these core questions, the paper first highlights the confusions that are caused by an incomplete reading of Clausewitz's theoretical framework that underpins his magnum opus *On War*. The analysis then proceeds to distill the additional sources of confusion that can lead to disagreements during the employment of the concept. This paper discusses the contentious issues of inconsistency in definitions, misunderstandings regarding the nature of the COG concept, divergent services' perceptions, and finally, inconsistencies that are caused by the inherent unpredictability of war. The ideas are then applied historically to help understand the anomalies that arose during the Persian Gulf War. Unlike previous studies which purport that much of the confusion can be easily removed by having clearer and more unambiguous definitions, the findings suggest otherwise; the sources of confusion are multifarious, and some may not even be amenable to complete resolution. The implication of having these enduring inconsistencies is neither to jettison the concept nor to return to a reductionist concept of the COG but to confront nonlinearities by applying the principles of systems thinking, superior leadership, and decisive action that is supported by a flexible feedback system.

Introduction

Everything in war is very simple, but the simplest thing is difficult.

—Carl von Clausewitz

The center of gravity (COG) concept has been described in joint doctrine as the “basis for devising both national military and theater strategies.”¹ Yet, the concept remains a subject of much confusion, even among seasoned military practitioners and learned analysts. Dr. Eliot A. Cohen, director of the *Gulf War Air Power Survey*, writes the following:

Clausewitz argued that the essence of strategy lies in discerning the opponent’s “center of gravity”. . . and directing one’s force against it . . . (but) the term is *problematic*: Can there be only one center of gravity or several? What happens if a center of gravity is unreachable? Can one ever determine a center of gravity in advance, or can it be discerned only retrospectively? And, if all strategy ultimately involves a clash of forces anyway, what is the point? The issue . . . is *not merely academic*. During the planning of the coalition’s campaign against Iraq in 1991, the term “center of gravity” was used repeatedly, but it was not clear what it really was—the person of Iraq’s dictator, Saddam Hussein, his system command and control, the elite forces that were loyal to him (the Republican Guard), Iraqi military industry, or the forces occupying Kuwait that were the proximate cause of war. The confusion over the center of gravity *had real consequences* for planning and for action, as American commanders struggled over the priority of various targets for air attack. (Emphasis added)²

Cohen’s comments articulate a puzzle that this paper addresses. Specifically, this paper examines the core questions: Can we ever resolve the inconsistencies surrounding the use of the COG concept? And if not, what are the implications of this confusion for the employment of the concept? Before proceeding, it is important to highlight that this research paper has a limited aim of understanding rather than explaining the inconsistencies. These terms are worth distinguishing as they embody very different purposes and suggest the use of different methodologies.³ “Explainers” usually seek to generate and test hypotheses such as “a change in x caused y.” The process involves the identification of a particular factor that is deemed to have caused a particular outcome, followed by a rigorous study of a statistically significant number of cases to test

whether the factor singled out was indeed the likely cause or merely a coincidental occurrence. By contrast, the desire for understanding (as in this paper) involves a search not so much for the cause of an event as for its meaning. “Understanders” therefore seek to investigate a particular event or state of affairs, rather than a set of cases. They delve into history not only as a bank of information that might prove or disprove a theory but also as a narrative that permits a greater appreciation of the origins, evolution, and consequences of an event.

With this limited aim in mind, the analysis addresses the thorny issue of whether we can ever penetrate the mystique surrounding the use of the COG concept. The analysis identifies the various sources of confusion that give rise to the inconsistencies and examines the extent to which they can be resolved. One key assumption is that grappling with the inconsistencies is not, as suggested by Cohen, an intractable enterprise. By carefully identifying the underlying assumptions that accompany the use of the COG concept, this research paper highlights how much of the confusion can be understood and in some cases even be resolved. The analysis traces some of the present confusion back to our failure to fully grasp Clausewitz’s thinking on the matter. The investigation examines four other key sources of confusion. As there is no attempt to apply a scientific explanation to each of these sources of confusion, I label them as propositions, which I apply to a historical analysis of the Persian Gulf War. The focus is specifically on how these propositions can shed light on the heated debate of whether the Republican Guard (RG) was a COG. Unlike previous studies that purport that some grand unifying definition or determination approach to the concept can help achieve universal consensus, the main thrust posits a different hypothesis. It suggests that while some of the sources of confusion are amenable to eventual resolution, complete consensus is unattainable due to the unpredictable nature of war. This is not to minimize efforts to secure greater consensus over the employment of the COG concept, but it is a warning against quick fixes. Raising the possibility of unpredictability brings ire for practitioners who are less interested in intellectual qualifications than a ready guide for decision making in the real

world. The analysis will therefore be incomplete unless it addresses the application issues. It explores the implications that these enduring inconsistencies have on the application of the COG concept. It deals with the perennial paradox of employing the concept in the uncertain environment of war. It proposes an overarching approach to help us think about and understand the COG concept so that its users are not paralyzed, and that the usefulness of the concept is retained. Conclusions of this research and the lessons learned are summarized.

In the Beginning—Clausewitz's Center of Gravity

The teachings of Clausewitz remain and will always remain ambiguous.

—Raymond Aron
Clausewitz, Philosopher of War

Any attempt to study Clausewitz's ideas on the COG or *Schwerpunkt* must avoid two potential pitfalls.⁴ First, because *On War* is replete with concepts that reflect a creative tension,⁵ a cursory and selective analysis can often lead to a one-sided and biased understanding of the COG concept. Second, one must take care not to overemphasize the literal meanings of *Schwerpunkt*. After all, Clausewitz warns that "our definitions are aimed only at the centers of certain concepts; we neither wish nor can give them sharp outlines."⁶ With these points in mind, a comprehensive look at Clausewitz's thinking on the matter is done before outlining the implications that emerge from the overview.

Although the concept is briefly mentioned in book 4, Clausewitz's ideas on the COG are found primarily in books 6 and 8 of his masterful thesis *On War*. In book 6, the COG concept is first fully developed when Clausewitz discusses the concept at what we now call the operational level of war, focusing on the armed forces of the enemy. This focus follows from his earlier book 4, where he calls the battle the true COG of war.⁷ Clausewitz points out that "a center of gravity is always found where the mass is concentrated most densely. It presents the most effective target for a

blow.”⁸ After drawing this analogy with war, he launches into a discussion of unity and cohesion, necessary elements of a COG, and illustrates how unity and cohesion can be found in a single fighting force. It is from this discussion that some readers mistakenly assume that the enemy’s military force is always the COG in combat. Clausewitz is quoted as saying in book 6 “those centers of gravity will be found wherever the forces are most concentrated.”⁹

This narrow definition of the COG finds a ready audience among those who prefer to focus on an enemy’s military rather than on other less tangible elements of power. James J. Schneider and Lawrence L. Izzo, in their article “Clausewitz’s Elusive Center of Gravity,” even suggested that Clausewitz may have gone too far by suggesting personalities and public opinion as COGs.¹⁰ Yet, to conclude that the enemy’s army is always the COG is excessively restrictive. At the end of book 6, Clausewitz cautions that the illustration of the COG concept is incomplete. But book 8 “will describe how this idea of a center of gravity in the enemy’s force operates throughout the plan of war . . . That is where the matter properly belongs; we have merely drawn on it here [in book 6] in order not to leave a gap in the present argument.”¹¹ Clausewitz acknowledged inconsistencies in the way the term *Schwerpunkt* was used in his drafts of books 2 through 6. He noted in his plans for revising *On War* that book 6 was only a sketch, and that he hoped to clear his mind when writing book 8 and subsequently revising books 2 through 7 accordingly.¹² Since Clausewitz died before the revisions could be made, it becomes crucial that we consider book 8 as we grapple with his overall intent.¹³

In book 8, Clausewitz described the COG concept by alluding to the sources of strength that emerge from the nature of conflict and the unique characteristics and aims of the belligerents. Even though Clausewitz notes in book 8 that “defeat and destruction of [the enemy’s] fighting force remains the best way to begin, and in every case will be a very significant feature of the campaign,”¹⁴ he argues that under specific circumstances the enemy’s COG could be a city, a community of interest among allies, a personality of a leader, or even public opinion.¹⁵ The Clausewitzian con-

cept of *Schwerpunkt* in book 8 extended beyond the destruction battle between fielded forces and included both tangible and intangible sources of moral and physical strength, power, and resistance.

For readers accustomed to the unitary concept of the COG centered on military forces, it becomes even more unsettling when one also takes into account Clausewitz's perception of war in general. In chapter 6 of book 8, Clausewitz made his underlying theoretical framework explicit when he expounded on the primacy of politics over the military.¹⁶ This resonated with the central ideas laid out in book 1, the only one completed to Clausewitz's satisfaction. There he discusses the paradoxical trinity stemming from primordial violence, the play of probability and chance, and rational calculation. He notes that we must develop a theory that "maintains a balance between these three tendencies, like an object suspended between three magnets."¹⁷ The trinity is a notion that helps to unify all the key concepts in *On War*. Yet, it is also a notion that reflects the nonlinear worldview of Clausewitz that some scholars have persuasively pointed out.¹⁸

What Does All of This Mean?

Unraveling the Clausewitzian conception of the COG is made difficult due in part to the methodology of his work,¹⁹ and in part because it was an unfinished masterpiece.²⁰ Unlike pessimists who would like to relegate the concept, with a myriad of interpretations, to a list of useless "doctrinal buzzwords that obscures the meaning of operational art,"²¹ this author suggests that comprehending Clausewitz is not a hopeless endeavor. Specifically, a careful reading of Clausewitz helps us identify two distinct approaches for interpreting the concept. If one is a "book 6—Clausewitzian," one will highlight Clausewitz's emphasis on the opposing army, which is clearly understandable given the context of his writings in the nineteenth century. This interpretation has found much favor among writers with a United States Army (USA) background, who by training and experience will generally prefer a terrain-centric perspective of the campaign.²² Words in publications like the 1993 Field Manual (FM) 100-5, *Operations*, "the ultimate aim of all military

operations is the destruction of enemy armed forces” further reinforce and perpetuate such a perception. On the other hand, if one is a “book 8—Clausewitzian,” as it appears Clausewitz would like us to be,²³ one will take a broader and perhaps more amorphous view of the concept. In this view, the COG is derived as a function of our understanding of the paradoxical trinitities of the belligerents; drawing from that, an understanding of the “hub of all power” which characterizes the COG of the enemy emerges.²⁴ Knowing these distinctions will help readers understand the underlying assumptions better when they next see an invocation of Clausewitz in support of a certain interpretation of the COG.²⁵ Often these assumptions are unstated and lead to great confusion. As this discussion has shown, taking fractions of his arguments out of context can lead to a vulgarized variant of Clausewitz.

Interpretations of the COG, however, do not end with Clausewitz. Since then, the concept’s appeal to military strategists has not only ensured its survival but has also produced more numerous and contradictory definitions as it is continually molded to suit the users’ purpose. This research paper also traces some of these additional sources of confusion.

The Definition and Nature of Center of Gravity: Revealing Additional Sources of Confusion

Reaching out into his bag and taking out a stone, he (David) slung it and struck the Philistine on the forehead. The stone sank into his forehead, and he fell facedown on the ground. . . . When the Philistines saw that their hero was dead, they turned and ran.

—1 Samuel 17:49–51

Comprehending the COG is a complex enterprise. One should therefore be skeptical about single isolated explanations for the lack of consensus surrounding the concept. Nevertheless, we need to prune away as much of the undergrowth as we can so that we can identify the best lumber to gainfully employ the concept in war. Otherwise, subsequent

application of the concept can be feckless or even counter-productive. This section suggests that, in addition to the misreading of Clausewitz, much confusion and disagreement can be traced back to four key reasons. I denote them as “propositions.” By highlighting these reasons, hopefully we can remove some of the COG mystique that continues to haunt analysts and operational planners today.

Proposition #1: Confusion Is Caused by a Lack of Consensus of Definitions

The lack of consensus over the definition of the COG has been one of more commonly studied issues. Yet, much confusion still ensues. To provide a flavor of the spectrum of views on this matter, see table 1 for some common definitions.²⁶

Table 1
Definitions for Center of Gravity

| |
|--|
| <p>(1) Center of gravity is “not a source of strength, but rather a critical vulnerability.”</p> <p>(2) Center of gravity is “always found where the mass is concentrated most densely.” Alternative but popular version: center of gravity is “a strength not a vulnerability.”</p> <p>(3) “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 . . . the point at which all our energies should be directed.”</p> <p>(4) Centers of gravity are “those characteristics, capabilities, or locations from which a military force derives its freedom of action, physical strength, or will to fight.”</p> <p>(5) The center of gravity is “something the enemy must have to continue military operations—a source of his strength, but not necessarily strong or a strength in itself.”</p> <p>(6) Center of gravity is something that if affected (i.e., destroy, disrupt, neutralize, or delay) can cause cascading deterioration that prevents the foe from achieving his aims and allows the achievement of our aims.</p> |
|--|

Sources: (1) Fleet Marine Force Manual 1, *Warfighting*, 1989, 85; (2) “Book 6—Clausewitzian Interpretation,” *On War*, 485; (3) “Book 8—Clausewitzian Interpretation,” *On War*, 595–96; (4) Joint Publication 3-0, *Doctrine for Joint Operations*, 1995, III-20 (similar in Air Force Doctrine Document 1, *Air Force Basic Doctrine*, 1997 and Field Manual 100-5, *Operations*, 1993); (5) Naval Doctrine Publication 1, *Naval Warfare*, 28 March 1994, 35; and (6) author’s adaptation.

While each of these definitions share some similarities, they also convey different nuances; Definitions (1)²⁷ and (2)²⁸ even appearing contradictory. Consequently, it is not surprising that these differences can lead to disagreements in the determination of the COG. Is there any way to arrive at a greater consensus on this issue? To examine this question, we can analyze the pros and cons for adopting each definition. Definition (6) is adapted by author.²⁹ The key criteria used for the evaluation is the extent to which the particular class of definitions provides a useful focus for campaign planning, the prime purpose for the concept. To facilitate the assessment, the plethora of definitions is categorized into three main classes.³⁰ Class A focuses on the notion of critical vulnerabilities, for example definition (1); Class B focuses on the notion of strength—definition (2); Class C focuses on the sources of strength—definitions (3)–(6).³¹

Class A definitions emphasize the importance of focusing on vulnerabilities. Its motivations originate from the desire to avoid a strength-on-strength clash during a conflict. This concept is especially popular among writers who propound the theory of maneuver warfare as it provides them with a useful tool to distinguish between maneuver and attrition warfare.³² Such a concept, however, is far removed from what Clausewitz originally had in mind.³³ Indeed, theorists who use this definition acknowledge this and go to great length to explain why the original Clausewitzian concept should be avoided. By adopting a “book 6—Clausewitzian” interpretation of the COG, they argue that the original definition simply encourages the bloody head-on clash between two armies, leading to an attrition battle that is seldom the most efficient form of warfare. While the call to seek vulnerabilities is laudable, the misappropriation of the term to create an antithesis to promote the maneuver warfare theory can potentially lead to greater confusion. It is unclear whether the enemy’s vulnerabilities here mean something that is easy for friendly forces to target (i.e., the notion of being open to attack) or something which, when hit, makes the enemy vulnerable and leads him to capitulate (i.e., the notion of having its strength or source of strength removed). Clearly, if it is the latter, then its distinction from the other classes of defini-

tions is less significant than many maneuver theorists contend. On the other hand, if it refers to the former notion of being open to attack, one can counter that not all of the enemy's critical nodes are inherently weak. Does that mean that those critical nodes that are strongly defended should, by definition, be ignored? Surely this would be a dangerous a priori assumption.³⁴ More importantly, the definition is grossly incomplete as it does not help planners appreciate what critical means and hence fails to provide a useful focus for the campaign planning efforts.

Class B definitions emphasize the enemy's strength and are most clearly identified with a "book 6—Clausewitzian" concept. These definitions focus the campaign planners on wherever the forces are most concentrated. COG is therefore synonymous with the center of mass. Adopting such a concept raises two questions. First, many observers have pointed out that the concept of mass has changed so radically since the nineteenth century that one can justifiably question the validity of its original concept in this postindustrial age.³⁵ Second, as maneuver warfare theorists have warned, this narrow focus on physical mass can potentially lock its advocates into an attrition warfare approach, resulting in a massive and bloody contest of destruction, as in World War I. Furthermore, such a concept leaves no room for the use of operational art to achieve paralysis of the enemy. As Cohen puts it starkly: "If all strategy ultimately involves a clash of forces anyway, what is the point?"³⁶

This leads us to the class C definitions, which emphasize the sources of strength. Although there are many variants under this category, they share the similar emphasis of focusing on the effect it renders on the enemy (i.e., it aims to target the very source of the enemy's strength). The distinction between strength and sources of strength is not often acknowledged, but they have fundamentally different underlying assumptions. Unlike the previous two categories, class C does not make a priori assumptions as to whether the focus for the main effort is inherently strong or weak. For example, the enemy's will does not need to be a physical strong point, but it is clearly a potential source of strength. Some theorists try to reconcile these differences by making an arbitrary distinction between the operational and strategic levels of war. They argue that at the

operational level the focus is generally on the center of the enemy's mass, while at the strategic level the focus is broader and may include other sources of the enemy's strength.³⁷ This distinction is misleading. Even at the operational level, a deeper analysis of the sources of an enemy's strength can be made, as opposed to arbitrarily concluding that the enemy's massed forces should naturally be our main focus. This author believes that the conceptual differences between classes B and C are rooted in the philosophical divide between a "book 6" and a "book 8" interpretation of Clausewitz.³⁸ The latter goes beyond the simple emphasis of mass to a broader concept of the enemy's characteristics as a whole, sometimes including even metaphysical considerations. This author also submits that the class C definition guides analysts to consider the full complexity of the enemy and the nature of war. Of course, even within class C, there are variants of definitions from which one can choose. By restricting our discussion to the selections listed earlier—definitions (3), (4), (5), and (6)—it can be argued that definition (6) gives the operational planners the best focus for their campaign planning. Definition (5) simply defines COGs as sources of strength. It is concise and points operational planners in the right direction but its focus is too broad. Definition (3) uses the popular Clausewitzian analogy of the hub of power and movement to capture the idea of the source of strength. But the analogy of a hub may provide a misleading notion that there is only one COG.³⁹ Definitions (4) and (6) contain a good elaboration of what might constitute a source of strength. Definition (6) rises to the top because of its clear emphasis on cascading deterioration within the context of systems effects, and its explicit linkage between the COG concept and the considerations of friendly and enemy objectives.

Two principal implications emerge from this extended discussion. First, it demonstrates how existing definitions of the COG contain subtle and important differences that can lead to confusion during operations. Second, the brief analysis of each definition suggests that obtaining greater consensus on this issue is not an impossible task.⁴⁰ Yet, much remains to be done in this area, both in updating doctrine publications, and, more importantly, in sensitiz-

ing students and planners to the nuances of the various definitions. Without the latter, the revised definitions in the publications will merely be words without significance.

Proposition #2: Confusion Is Caused by a Lack of Consensus over Its Nature

The second source of confusion results from two contentious issues regarding the nature of the center of gravity. First, as highlighted by Cohen: “Is there only one COG or many?” Second, what is the relationship between objectives and the COG? We will consider each issue in turn and assess the possibility of resolving the inconsistencies.

One or Many? The origins of the first paradox can arguably be traced back to Clausewitz. When Clausewitz first adopted the phrase *center of gravity*, he employed a term that is borrowed from the field of physics. In scientific terms, there can only be one COG for each object. Additionally, his use of the analogy “the hub of all power and movement” further gives the impression that there is only one COG. Clausewitz’s operational usage of the term, however, has little in common with its physical analogies, nor was it his intention that this phrase be taken literally in a physical sense, as the discussion in the section titled “In the Beginning—Clausewitz’s Center of Gravity” has pointed out. More specifically, while his intention was to emphasize the need to focus the main effort, Clausewitz wrote in *On War* that the state of having one COG was an ideal one.⁴¹ Clearly, there was no inherent reason why there could not be more than one COG.⁴² The sooner this arbitrary conception is removed, the sooner we will reduce the confusion generated through the use of the concept.⁴³

Dominant Characteristics of the Belligerents. The second contentious issue involves the relationship between objectives and COGs. Much confusion arises because operational planners fail to make explicit the underlying objectives they have in mind when they insist that “x is the true COG and not y.” The problem is accentuated when one remembers that in any major campaign, there are likely to be multiple objectives that might individually be assigned to different parties. Consequently,

each party will have a different perspective of where the main effort should be. Forcing them to share the same COG would be counterproductive in this situation. To resolve the confusion, we need to establish why and how objectives are linked to the COG.

One may be tempted to resolve the first question of whether the objectives are linked to COGs by simply analyzing the various definitions of COG; but such an analysis quickly becomes a tautology. For example, if the COG is simply defined as a source of strength as found in definition (5), one can conceivably apply a five-ring analysis (à la Warden) to derive a list of enemy's sources of strength, regardless of the objectives at hand. On the other hand, if one adopts definition (6)—the COG is that which causes a cascading effect on the enemy so that it “prevents the foe from achieving his aims and allows the achievement of our aims”—then objectives become intricately linked to the determination of the COG. The way to resolve this dilemma is to introduce a higher criterion, such as judging the alternative definitions against the original purpose for having the concept. If the purpose is not to provide campaign planners with a focus on the enemy's sources of strengths but instead on those that will “significantly contribute to our ability to impose our will over the COG at the next higher level of war,”⁴⁴ then linking objectives with COGs will be essential. Doing so guides us to target enemy's sources of strength that can lead us to eventual victory.

If the above argument holds true, the next challenge then is to understand the relationship between objectives and the COG. Do objectives refer to friendly objectives, enemy objectives, or both? The short answer is both.

There is a direct relationship between friendly objectives and the COG. The point of our main effort should be such that it (the affected COG) will cause the enemy system to change in such a way that it functions the way we want it to (i.e., in accordance with our friendly objectives). And if our objectives are congruent at each level of the war, such actions will eventually lead us to victory. The relationship between enemy objectives is more subtle and indirect. A useful way to understand this is to envisage the enemy as a system with many nodes. The enemy's objectives will determine how the enemy employs its system. This in turn

determines how the nodes in its system work together (i.e., the linkages) to meet its objectives. In other words, understanding the enemy's objectives helps one to understand the linkages in the enemy's systems, which will in turn enable campaign planners to determine the critical nodes that have the greatest cascading effects (i.e., COGs) on the enemy. A failure to understand these dynamic relationships has led to unnecessary confusion.

A good example of this was the contention in the early stages of the Gulf War over whether the Iraqi Scuds qualified as a COG that justified the allocation of scarce air assets. Initially, Gen H. Norman Schwarzkopf was reluctant to follow Secretary of Defense Dick Cheney's direction to step up the Scud campaign. After all, the accuracy of the Scuds was poor, and since there was no evidence that the initial launches contained any payload of poison gas, the military impact of the Scuds was deemed to be relatively insignificant (i.e., they did not appear to be a source of strength. At one point, this insubordination led Secretary Cheney to exclaim to Gen Colin L. Powell, "god---- it, I want some coverage (against Scuds) out there. If I have to talk to Schwarzkopf, I'll do it."⁴⁵ In this case, Secretary Cheney's judgment turned out to be closer to the mark. What General Schwarzkopf failed to consider were the enemy and friendly objectives; Saddam Hussein's objective for firing the Scuds was not to target military installations, which required great precision, but against Israel's general population. With great astuteness, Secretary Cheney quickly saw the need to "keep Israel out of the war" and protect the coalition's unity. It was only when these dynamic connections became explicit that everyone, including the US Central Command, began to recognize how an inaccurate Scud could indeed become Saddam's source of power.

Proposition #3: Confusion Is Caused by Differences in Services' Perspectives and Concept of Operational Art

Reaching consensus on the definition and nature of the COG concept is made difficult by a third source of confu-

sion: inherent differences in services' perspectives and underlying theoretical concept of operational art. Organizational inertia and conceptual dissimilarities caution against a naive search for quick solutions in resolving the paradoxes. A brief survey of the diversity of services' perceptions will reinforce this.

The US Air Force (USAF) generally takes a "targeting" approach.⁴⁶ In line with the flexibility and versatility of airpower, the USAF prefers to describe multiple COGs in terms of strategic and operational targets throughout the theater of operations. On the other hand, as a relatively small force accustomed to forced entry into a theater, the US Marine Corps (USMC) naturally prefers to attack the enemy where it is weak. Thus, for a long time, the USMC has elected to describe the COG as a critical vulnerability rather than a source of strength. On the other hand, the USA, being relatively more self-sufficient, has little problem viewing the COG as the enemy's strength. Furthermore, the Army's concept of the COG has been greatly colored by the physical analogies of mass and the hub of power, leading to a strong insistence that there should only be one COG. The US Navy (USN) has only introduced the COG concept into its doctrine in the past decade. At first, the USA, the service that the Navy has had much operational experience supporting, heavily influenced the USN's COG concept. Consequently, naval doctrine acknowledged the existence of only one COG. With its emphasis on littoral warfare, naval doctrine has become increasingly aligned with the USMC; it now seeks "opportunities to access and destroy a COG" through critical vulnerabilities.⁴⁷

While many of the above inconsistencies can be traced to disagreements over the definition and nature of the COG, one must remember that these differences also reflect a deeper disconnect. This point was made persuasively by Col Dennis M. Drew, associate dean of the School of Advanced Airpower Studies (SAAS), when he highlighted the differing doctrinal worldviews of the USA and the USAF. Constrained by geography, the Army's worldview is often limited to the immediate problem of enemy forces in front of them. The airman's worldview is limited only by the capability of his equipment. Even when the enemy is

found at great distances, airpower's speed can make the airman's problem as immediate as the soldier's. These differing worldviews often cause differences of opinions between soldiers and airmen, including their perceptions of the COG.⁴⁸

Ultimately, differences in services' perceptions lead to different theories of war, contributing to disparate conceptions of COGs. For instance, to view the enemy as components of state systems as in John A. Warden III's five-ring theory, one will determine the COGs according to the concentric rings of command, essential production, transportation, population, and military forces, with descending orders of importance.⁴⁹ On the other hand, to adopt a model, as proposed by John Arquilla, that seeks to explain victory in terms of information dominance, one reaches a different conclusion.⁵⁰

How to resolve these differences—by making a list of all the existing theories of war and deciding which is the best to adopt across the services? Besides the impracticality of consolidating all existing (and indeed future) theories, such a research effort faces another difficulty. Many of these theories are really perspectives that suggest generalized patterns that seem to correlate with history. They do not, on the whole, present hypotheses that are falsifiable. If one also takes into account the postmodernist contention that definitions, perspectives, and theories are not only ways of representing the facts but are also ways of constructing facts, the problems appear even more intractable.

This discussion is a reminder that the road to greater consensus is not simply a search for clear and unambiguous definitions, as some commentators appear to suggest.⁵¹ There are no easy answers to the quagmire of how we can resolve the differences. Colonel Drew's comments suggest that each service's perception of war can be equally legitimate and yet significantly divergent. Stovepiping each other's perspective into an artificial construct is not necessarily productive or beneficial. Instead, one should strive to gain a deeper appreciation of each service's concerns and its theoretical conceptions of war. This will allow us to ask the right questions when there are disagreements and to better assess and weigh the alternatives

during operations. The postmodernist challenge also reminds us to question the ways in which our perspectives and theories construct and define the way we view our enemies, and hence affect the way we define COGs and subsequently, the way we fight.

Proposition #4: Confusion Is Caused by the Unpredictability Inherent in War

The fourth reason for the enduring disagreements over the COGs is the inherent unpredictability of war. Unpredictability of war can be caused by at least two factors.⁵² First, there is a lack of perfect intelligence. The amount of intelligence required to examine all the linkages within the enemy system will always exceed the resources available. Even today, eight years after the Gulf War, new articles continue to suggest that campaign planners missed some critical information that supposedly represented Iraq's true COG.⁵³ Second, there is the special force that chance, uncertainty, indirect effects, unintended consequences, human errors and frailties, and a host of other nonlinearities exert on the outcomes of actual war. Alan D. Beyerchen reminds us that mapping a seemingly linear concept like *Schwerpunkt* on the nonlinearities of real war can prove to be extremely unsettling.⁵⁴ In a nutshell, we come full circle to the dilemma we faced when we studied the different interpretations of Clausewitz. Do we cut through the maze of confusion by adopting a "book 6—Clausewitzian" approach of simplifying and linearizing the COG to a quote: "defeat of the enemy fighting forces remains the best way to begin"?⁵⁵ Or do we try to understand the concept in both its psychological and physical realms that allow for nonlinearities, as a "book 8—Clausewitz" would suggest? This author believes that a "book 8—Clausewitzian" approach better reflects the complexity that real war presents. If this is true, it then suggests that some disagreements over the COG may never be resolved. This in turn raises the question of how one should act in such a situation fraught with uncertainty. Does this unpredictability render the concept useless? Will it paralyze those who choose to employ it?

Summary

The four propositions highlighted represent four main sources of confusion. They are not mutually exclusive nor do they always operate separately. Yet, these strands are worth distinguishing carefully as each has something to say about the questions to ask when faced with disagreements over the COG concept and how we might set about answering them. The next section applies these propositions in a brief historical analysis of the Gulf War.

Analyzing the Gulf War: Will We Ever Know If the Republican Guard Was the Only “True” COG?

It doesn't take a genius to figure out . . . (the center of gravity).

—Gen H. Norman Schwarzkopf

During the Gulf War, many disagreements arose over the determination of the “true” COG.⁵⁶ The following sections focus on the central debate concerning the RG. The analysis is divided into two sections. The first section examines how the perceptions of the COGs differed among the key participants of the war. The second section outlines how the propositions listed earlier help to understand the inconsistencies involving the specific debate about the RG. This analysis primarily aims to understand the sources of confusion rather than to present a case for the true COGs or to fully resolve these inconsistencies.

Differing Perceptions of the Center of Gravity

Beginning at the very top, General Schwarzkopf identified the COG as “that thing that if you destroy it, you destroy his ability to wage war. The centers of gravity were Saddam Hussein himself because of the highly centralized leadership. I don't mean personally destroyed. I mean the ability to function. Number two, the Republican Guard. And number three, his chemical, biological and nuclear capability. It doesn't take a genius to figure out that if

those things are gone, his ability to wage war is to all intents and purposes finished.”⁵⁷ Clearly, Schwarzkopf saw the RG as one of three distinct COGs.

For the USAF, perceptions differed substantially between the joint force air component commander, Gen Charles A. “Chuck” Horner, and the leader of the Checkmate planning team, Colonel Warden. Warden’s perception of the multiple COGs was clear from the initial presentation he gave to General Schwarzkopf (table 2).

Table 2
Iraqi Target Systems

| Leadership | Key Production | Infrastructure | Population | Fielded Forces |
|-------------------------|-----------------------------|----------------|------------|--|
| National Leadership | Electricity | Railroads | | Strategic Air Defense |
| National C ² | Oil—Internal Consumption | Airfields | | Strategic Chemical Warfare Capability |
| | Military Production | Port | | |

Source: Gulf War Air Power Survey (GWAPS), vol. 1, Planning and Command and Control (Washington, D.C.: Government Printing Office, 1993), 145.

These 10 target sets (COGs) were more than the three identified by Schwarzkopf but the plan eventually submitted by Horner was expanded to 12 target sets.⁵⁸ Notable absences from Warden’s initial list were the RG and the Scud missiles.

True to their doctrine, the ground forces identified only one military COG—the RG.⁵⁹ The planning of the ground campaign was highly influenced by graduates from the School for Advanced Military Studies (SAMS), specifically a small Jedi team headed by Lt Col Joe Purvis. Colonel Purvis later elaborated the rationale for the selection process.

We attempted to identify the center of gravity. This proved difficult due to the normal discussions [that occur in SAMS]. Also, the CENTCOM staff became more focused on what it [the center of gravity] was as opposed to what do we do with it. Therefore, we did not use the term, except in the [planning cell]. In any case, at the strategic level, we decided that Saddam was

the key, *but that we could do nothing about him and cause the battle to be fought without centralized command. The Republican Guard was the focus at the operational level.* If we could mass our ground forces on the RG without fighting any other force, we had perfect success. Also, if the RG left the theater, surrendered, or were defeated, we still had, to our opinion, dealt appropriately with the “C.G.” (Emphasis added)⁶⁰

Will We Ever Know If the Republican Guard Was the Only True COG?

How then can we explain the confusion caused by the inconsistencies, and how far can we reduce these anomalies? Although the disagreements over the COGs are numerous, the focus here is on the debate: Was the RG the only true COG?

Definitions

Some of the confusion could have been caused by an inconsistency in definitions. Warden views COGs as a critical vulnerability,⁶¹ which possibly embodied both the notions of weakness and open to attack. Holding such a perspective may partially explain why he avoided listing the RG as a COG as it would have represented an attrition strategy of pitting strength against strength, à la the “book 6—Clausewitzian” concept of war. Purvis, on the other hand, reflecting the USA’s perspective, appeared to include the notion of attainability into his concept of what constitutes the COG. He acknowledges that Saddam was the key but in the same breath dismisses it when he concluded we (i.e., the Army) could do nothing about him. It was therefore not surprising that Purvis’s analysis, with his focus on the enemy’s surface forces, would eventually lead him to conclude that the RG was the sole COG. However, confusing attainability with the determination of the COG led him to ignore an enemy’s COG just because the Army was incapable or unwilling to impose its will upon the target. The feasibility of targeting a COG should be made independent of its identification.

Nature: Numbers and Objectives

Inconsistency in the number of target lists (COGs) as perceived by the various parties, and a failure to recognize the linkages between mission objectives and the defined COGs, led to further confusion over what the true COGs were. For instance, the mission the Army received on 18 September 1990 was to plan the ground offensive. Given such a defined mission, it was perhaps understandable that the Army focused quickly on the RG as the focus for their main effort. The USAF, however, was given a much broader mission scope because of the flexibility and versatility of airpower. With its expanded objectives, its assessments of the enemy's hubs of power expanded correspondingly.⁶²

Services' Perspectives and Theoretical Constructs

Dissimilar services' perspectives and theoretical constructs also led to very different views of what constituted the enemy's source of power. Warden, for instance, working from his theoretical five-ring framework, saw the enemy's leadership as the key focus. The other rings—organic essentials, infrastructure, population, and fielded forces, including the RG—were distractions generally best avoided. These target systems would only be attacked as necessary to expose the leadership ring to offensive action. Consequently, Warden ranked the RG as far less significant than did the other planners, who subscribed to the surface-centric AirLand Battle doctrine.⁶³ Given the controversial nature of Warden's theories, it is interesting to ask if we can verify these theories retrospectively in the light of the historical records we now have? Some, like Col Richard Szafranski, USAF, believe that the answer is straightforward: "Clausewitzian purists can argue over what the master intended by *Schwerpunkt*, just as intellectual purists can argue over what transforms a diagram into an authentic model. Purism matters less to action-oriented people than the *verifiable consequences* of action." (Emphasis added)⁶⁴ "They (air operations) worked,"⁶⁵ proclaims Szafranski, implying by inference, that Warden's theories were validated. If Szafranski is right, then perhaps the RG, as suggested by Warden, was not the true COG

after all. Historical events may in reality have less verifying power than Szafranski seems to suggest. To fully understand this, we turn to the element of unpredictability of war.

Unpredictability of War

Determining the COG requires us to assess the impact of the cascading effects on the enemy system, and the extent to which this impact achieves the friendly objective. Yet, making that assessment is fraught with great difficulties. For example, how do we ascertain the importance of the RG in a cause-and-effect relationship? To the Army, the fielded forces defined their view of the enemy, and the RG was perceived as the source of power that animated the entire military force. It was also implicitly assumed that Saddam would value his military capability highly and hence would be very sensitive to the targeting of the RG. In other words, targeting the RG not only caused cascading effects on the fielded forces but also impacted on Saddam's overall calculations. Warden, however, saw Saddam's calculations differently: "Many people have thought of the Republican Guard as the military primarily responsible for keeping Saddam in power. In actuality, the Republican Guard . . . was not the group which undertook the nasty day-to-day internal security work. Others did that, and they were *a far more important* target than the Republican Guard soldiers in Kuwait." (Emphasis added)⁶⁶

Even if we ignore the possibility of nonlinear second- and third-order effects of targeting the RG (which would compound the element of uncertainty exponentially), it remains clear that there was imperfect information available to the coalition during the war to make a definitive judgment on the correctness of each perspective. Did Saddam value his internal security forces more than his RG, as Warden suggested? After all, Saddam suffered and endured far more attrition of his ground forces during the Iran-Iraq War than he actually did during the Gulf War. How could intelligence analysts have known, with complete certainty, Saddam's psychology and the value he placed on his instruments of power? Ultimately, one may be resigned to share Col Phillip S. Meilinger's (professor of strategy, US Naval War College) conclusions: "It is highly

unlikely, however, that it will ever be possible to determine exactly what drove Saddam to the negotiating table: perhaps Saddam himself would be unable to answer the question definitively. In truth, given the complexity of war and human nature, it is most likely that (many) factors went into Saddam's decision-making process."⁶⁷

Summary

Writing in a Marine Corps University monograph after the war, Dr. Joe Strange suggested that the debate over the Republican Guard was caused by a confusion over definitions.⁶⁸ Hopefully this analysis demonstrates how the previously identified four sources of confusion provide a fuller account of the disagreements involved. Some of these disagreements could have been clarified if underlying assumptions about the definitions and nature of the concept were made more explicit. Greater consensus could also have been obtained if some of the informal doctrine, such as Warden's infamous five-ring analysis, had a prior opportunity to be disseminated and discussed across the services. Yet, many of these conditions are counterfactual demands. In reality, fog and friction will always characterize real war. This poses an important challenge for operational planners living in the real world and having to make real decisions in finite time. How should one think about the concept of COG given the inherent uncertainties in war?

Implications of Enduring Inconsistencies: How Should One *Think* about the Employment of the Concept?

*Although our intellect always longs for clarity and certainty,
our nature often finds uncertainty fascinating.*

—Carl von Clausewitz
On War

A full understanding of the mystique surrounding the COG concept requires wrestling with the implications of enduring inconsistencies. Yet, doing so places a dilemma that we all face in an increasingly complex operating envi-

ronment fraught with contradictions. If we think we know, we don't, and if we think we don't know, we still have to act as if we do. This thought process produces the leadership schizophrenia that is so troubling and creates conditions for potential paralysis. At the very least, leaders may look away and hope that their rationale for how they want things done will not be too sorely tested. Can we help but wonder why positive thinking is so seductive to those faced with complexity beyond comprehension? This section proposes three principles that help one think about the employment of the COG concept.

Principle #1: Employing the COG Concept Requires Systems Thinking

One of the key reasons why war is such an unpredictable affair is the fact that the enemy is not a static entity. On the contrary, history suggests that the enemy is better portrayed as an organism that continuously acts and reacts internally and with the environment. It embodies the interaction of living and nonliving subentities, out of which multiple COGs arise.⁶⁹ In order to grasp the profound implications of indirect effects and unintended consequences that pervade war, we need to engage in systems thinking or learning to view things as a whole.⁷⁰ The establishment of a grand systems theory is beyond the scope of this research paper but the mention of a few key implications of systems thinking is in order.

First, systems thinking refers to the attempt to view the world in terms of irreducibly integrated systems. It focuses attention on the whole as well as on the complex interrelationships among its constituent parts. Systems thinking assumes that the enemy is a self-organizing system in which individual parts adapt naturally to create order out of chaos. The focus is not just on individual entities but also on the dynamics between those entities and the embedding context in which the entities operate.

Second, the effects on social institutions, political states, and economic systems depend not only on what the case is but also on what its members and its leadership believe that it is. And since enemy nations are culturally

conditioned, understanding reality requires appreciation of historical and cultural dynamics.

Third, we must recognize that systems thinking is not natural to military practitioners who favor quick and decisive action. Comprehending complex indirect effects can appear daunting and with marginal utility. This disdain for systems thinking has also colored the way we orient our intelligence establishments.⁷¹ Information-gathering agencies are more accustomed to either developing diplomatic insights into the enemy's foreign policy, or securing tactical information about the enemy's military strength and disposition. On the other hand, a detailed understanding of the enemy's systems and how they interact with each other requires a fundamentally different type of military intelligence that is capable of conducting second- and third-order analyses of complicated networks. Such interdisciplinary intelligence is too often ignored.

Fourth, it is important not to exaggerate systems effects. Just because chaos theory predicts that the beating of a butterfly's wings can influence weather patterns halfway around the world doesn't mean that each time a butterfly flutters, storms are created. Although thinking in terms of one-way linear processes can often be misleading, it is unlikely that reductionist approaches could have become so entrenched if they were never applicable in the real world. A better way of seeing systems thinking is not as an alternative but as a complement to the reductionist approach. The former is more comprehensive, embracing the specialized perspective as one aspect of a general concept.

Fifth, although systems are intricately connected, system effects need not cripple human action. One strategy for action is constraining, where systems are rendered less system-like in their responsiveness, hence foreclosing options and facilitating action. A good example of this was the operational maneuver conducted during the Gulf War. Through feints and limited objective attacks, the assemblage of the Iraqi military strength was fixed into a well-defined unit of space detached from its strategic rear, affording the coalition the operational opportunity to split the defending mass from its centralized command authority, its main logistical bases, and its friendly reinforce-

ments. A second strategy that could be adopted is parallelism. When we are dealing with a system, we can rarely do one thing to produce a desired change. Because of indirect, delayed, or even unintended reactions by the enemy system, one usually needs to have multiple and simultaneous engagements to constrain and work with the dynamics of the enemy system to effect a significant change.⁷²

Still, in the final analysis, one is cautioned that systems thinking will not lead to a deterministic path. Uncertainty will still prevail, and that brings us to the next essential element, leadership.

Principle #2: Employing the COG Concept Is an Act of Leadership

When discussing COGs, it is tempting to confine one's analysis to concepts, techniques, and theoretical construct. Succumbing to this temptation can lead one into a spurious and frustrating effort to strive for more complex and deterministic theories for discerning the COG, without paying adequate attention to the people employing these tools. This oversight is dangerous because ultimately the effective employment of the COG concept is an act of leadership. This point is well articulated by Col Michael D. Wyly, who greatly influenced the formation of maneuver warfare doctrine in the Marine Corps: "It takes courage and moral character to select a main effort. That is why the weak commander and the amateur so often fail to do this. In fact, the weak commander will actively avoid choosing a main effort. It is convenient for the commander weak in character to avoid selecting a main effort because, if the battle goes unfavorably, he can blame someone else for the mistake. The commander who has taken a stand and selected his own main effort cannot do this."⁷³

Although Colonel Wyly was lecturing on the concept of the main effort at the lower operational and tactical levels, it is apparent how these same ideas of leadership can be pertinent when one interchanges the phrase *main effort* with the COG. But what do we mean by leadership? Cynics may counter that attributing the concept to an act of lead-

ership or military genius is like ascribing the whole argument to a black box.

To unravel this puzzle, we return to the originator of the concept to examine how Clausewitz reconciles a metaphor that apparently demands a huge amount of intelligence with the prevailing truth that war is often an unpredictable affair. According to Clausewitz, uncertainty on the battlefield can only be conquered by the military genius, a man with a very highly developed mental aptitude for war. Clausewitz is of course never dogmatic in his descriptions: to every rule he prescribes, he immediately notes the exception or limitation. Nevertheless, three faculties appear to be the cornerstones of military genius. Strength of character, the “ability to keep one’s head at times of exceptional stress and violent emotion,” allowed the reason of the commander to dominate his passions without destroying his drive.⁷⁴ Equally important was determination—a willingness to “stand like a rock,”⁷⁵ to act on belief despite uncertainty, to hold to a consistent course of action amid confusion. Clausewitz commended the consistent pursuit even of an inferior course of action. Determination (in Clausewitz’s sense) alone can prevent action from being paralyzed by uncertainty and the delays and hesitation caused by thought. The third indispensable characteristic of a military genius is his instincts. “All great commanders have acted on instinct.”⁷⁶ Clausewitzian concept of instincts combined both reason and intuition—“an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to truth . . . the quick recognition of a truth that the mind would ordinarily miss or would perceive only after long study and reflection.”⁷⁷ It is therefore this informed intuition, a confluence of thought and temperament that can master uncertainty and conquer the battlefield.

While Clausewitz was talking about military genius in the wider context of war, the same applies if one hopes to employ the COG concept effectively during operations. These leadership characteristics are crucial because they empower the players to act. Understanding the interplay between action and the COG concept is essential if we are to fully grasp how one should think about COG in a situ-

ation of uncertainty. This is elaborated in the third and final principle.

Principle #3: Determination of the COG Is an Evolving Process That Begins with Decisive Action and Sustained with Continuous Feedback

There is often a mistaken belief that one needs to know the true COGs with complete certainty before acting. Yet, because consensus is never truly achieved, one may be led to conclude that the concept is rendered operationally useless. This study suggests otherwise. The more we understand the concept, the more we realize that action is demanded, even from the position of incomplete information; procrastination can be the greatest hindrance to exploiting the enemy's COG. There are two fundamental reasons why this is so.

First, even though we may not be able to discern the COGs with complete certainty initially, action and feedback from enemy's responses can lead us closer to the true COGs. The strategic helix, first developed by Colonel Meilinger, best illustrates this point (fig. 1).

At the beginning, planners survey the enemy system in its entirety and deduce a number of perceived enemy's COGs. The true COG may in reality be hidden, as represented by the vertical pillar. Uncertain as it may be, the planners recommend targeting all the potential COGs through a series of parallel strategies, as suggested by Principle #1. As the war progresses, the commander, through feedback on the effects of his decisive actions and enemy's responses, shifts his targeting strategy and moves closer to the true COG. This process continues until the true COG is uncovered and effectively neutralized.⁷⁸ Determining the COGs is therefore an evolutionary process that is supported by decisive actions and continuous feedback.⁷⁹

Second, not apparent from the diagram is the dynamic relationship between our actions and the enemy's that favors the side that seizes the initiative. Because war involves the strategic interaction of at least two parties, our aggressive actions can confound our enemy, denying him the ability to influence the friendly COGs while enhancing our own ability for exploitation. When commanders act,

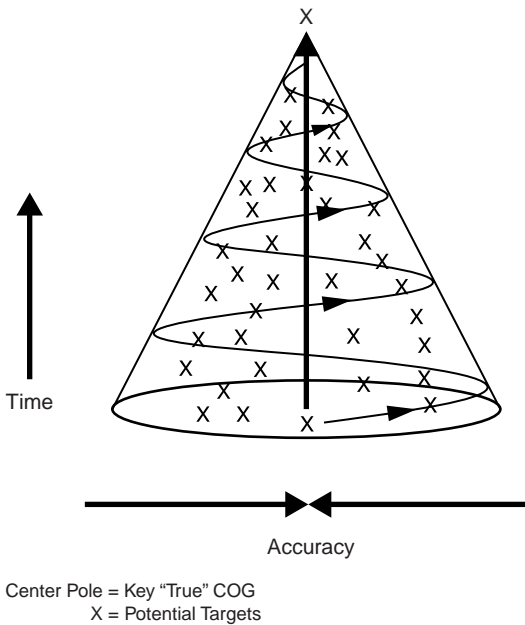


Figure 1. Strategic Helix

they multiply all the conditions of uncertainty for their adversaries and indirectly compensate for their own imperfect situational awareness. As opposing wills continue to interact, this creates further opportunities for either foe. Such opportunities are often born of the disorder that is natural in war. They may be the result of our own actions, enemy mistakes, or even chance. By exploiting opportunities, we create in increasing numbers more opportunities for exploitation. And it is often this ability and willingness to create and exploit opportunities faster than the opponent that generate decisive results. That is why decisive action is essential. The player with higher tempo constantly forces the opponent to react defensively to a series of attacks, threats, and feints, all the while advancing his own plan. At the extreme, the player does not need to be concerned very much with the enemy's intentions, because the player's tempo serves as a shield against enemy attacks. Time therefore becomes a COG in itself, for without the time to respond, the enemy's tools of war lose their power of influence, even before they are physically destroyed.⁸⁰

Summary

This list of three fundamental principles is by no means exhaustive. They do however help support the main thrust of this research paper; that is, despite the pervasive fog that characterizes our operating environment, uncertainty need not cloud our understanding of how the COG concept can effectively be employed. Nor do we have to return to an age of Laplacian determinism that assumes away the reality of unpredictability we find so often in war.

Conclusions and Lessons

One of the truisms of social science is that we will never have complete answers to complex phenomena. This research paper does not aim to derive a grand unifying theory for determining and employing the COG concept. Instead, it is a focused inquiry to discover how one should think about and understand the employment of the concept. Specifically, it deals with the twin challenges that Cohen implicitly places on analysts and campaign planners: How do we handle the inconsistencies and disagreements that surround the use of the concept? What are the implications if some of these inconsistencies remain unresolved?

This research paper recommends that to think about the COG concept requires a combination of two approaches. First, we must recognize the sources of confusion and take active steps to explicate the contentious issues where possible. This paper has highlighted four key areas where disagreements may arise and outlined how some of these may logically be resolved. It is useful to reiterate that a complete resolution of these disagreements is sometimes less important than a deep appreciation of the differing perspectives and underlying assumptions. Only then can we hope for a common framework, understood by all practitioners, from which we can plan to fight as a single team. Second, and equally important, students and operational planners must learn to combine the art and science of employing the concept in an uncertain world where the desire for complete consensus will always be frustrated. This paper proposes that one should endeavor to grasp the essence of the concept and to think systemat-

ically and creatively. One must realize that its employment is an act of leadership, where one is compelled to carefully weigh the alternatives and risks, followed by boldness in decision making. And with a tinge of humility, one should aggressively seek to establish flexible feedback systems to evaluate the effects of one's action, for the determination of the true COG is ultimately an evolving process.

Notes

1. Joint Publication (JP) 1, *Joint Warfare of the US Armed Forces*, 11 November 1991, 65; and JP 1, 10 January 1995, III-8-9 and IV-2.

2. Quoted in Richard H. Shultz et al., *Security Studies for the 21st Century* (Washington, D.C.: Brassey's, 1997), 365.

3. Martin Hollis and Steve Smith, *Explaining and Understanding International Relations* (Oxford: Oxford University Press, 1990). Hollis and Smith raise a similar point in their book.

4. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976). The English translation of center of gravity comes from Clausewitz's use of the Latin and German words *centra gravitatis* and *Schwerpunkt* in *On War*. In book 6, Clausewitz used the term *centra gravitatis* and subsequently used *Schwerpunkt* when discussing the same concept. Howard and Paret, editors of the 1984 translation of *On War*, consider the terms to be synonymous and translate both as center of gravity.

5. Michael I. Handel, *Masters of War: Classical Strategic Thought* (London: Frank Cass and Co., 1996), 181-83. Handel details the observation that there is a creative tension that underlies much of Clausewitz's understanding of war.

6. Clausewitz, 486.

7. *Ibid.*, 248. In Clausewitz's time, battles were indeed decisive in that they often determined the outcome of the war. The course of battle often realized the exhaustion of resources, and that the reserves were committed in the same day. Today, however, the results of a major battle are seldom sufficient to secure a strategic objective, but instead form part of a larger whole that seeks to achieve a decisive aim.

8. *Ibid.*, 485.

9. *Ibid.*, 486.

10. James J. Schneider and Lawrence L. Izzo, "Clausewitz's Elusive Center of Gravity," *Parameters*, September 1987, 56.

11. Clausewitz, 486.

12. *Ibid.*, 70-71.

13. I am indebted to Timothy J. Keppler for bringing to my attention Clausewitz's note regarding his plans to revise *On War* as well as the summary of Clausewitz's ideas in book 8 of *On War*.

14. *Ibid.*, 596.

15. *Ibid.*, 595-96.

16. *Ibid.*, 605-6. It is common to treat the primacy of politics over military affairs as a distinct cause-and-effect relationship—first politics sets the goals, then war occurs, and then politics reigns again when the fighting stops. Any overlaps suggest political interference in the execution of military operations—conjuring horrid images of the Vietnam experience

that resulted in much disaster. While such a dichotomy serves to provide the military with a maximum freedom of maneuver, it creates an artificial construct that is founded on a linear sequential paradigm. In reality, as Alan D. Beyerchen points out, Clausewitz's dictum that "war is merely a continuation of policy" appears far more profound as he seems to suggest not simply that political considerations take precedence over military deliberations but that war is intrinsically embedded in politics, and every military act has its accompanying political considerations, intended or otherwise.

17. *Ibid.*, 89.

18. Alan D. Beyerchen, "Clausewitz, Nonlinearity and the Unpredictability of War," *International Security* 17, no. 3 (Winter 1992): 59-90. See also Alan D. Beyerchen, "Clausewitz, Nonlinearity, and the Importance of Imagery," in *Complexity, Global Politics, and National Security*, eds. David S. Alberts and Thomas J. Czerwinski (Washington, D.C.: National Defense University [NDU], 1997), chap. 7. Similar points are noted in the writings of Barry D. Watts.

19. Even ardent admirers like Michael Howard concede that "it is not easy . . . to give a fair and comprehensive summary of Clausewitz's strategic doctrine, since it is presented with infuriating incoherence." Quoted in Lloyd J. Matthews, "On Clausewitz," *Army*, February 1988.

20. Raymond Aron, *Clausewitz: Philosopher of War*, trans. Christine Booker and Norman Stone (London: Routledge and Kegan Paul, 1983). Aron argues that the incomplete nature of *On War* is the primary source of misunderstanding.

21. John House, *Do Doctrinal Buzzwords Obscure the Meaning of Operational Art?* (Fort Leavenworth, Kans.: School of Advanced Military Studies [SAMS], 1989). The phrase is adopted from the title of this SAMS monograph by House.

22. Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*, Cummings Center series (London: Frank Cass and Co., 1997), 48. Some have even traced the roots of early German failures in this century (namely Schlieffen's operational perceptions) back to this particular reading of the Clausewitzian concept of COG. There is another group of analysts who uses this narrow definition to support their assertion that Clausewitz's ideas have passed their time by highlighting his overemphasis on the destruction battle aimed and directed towards the enemy army as flawed and dangerous.

23. This view is implied by Clausewitz's own caution against the tentative nature of book 6, his belief that book 8 was "where the matter (the COG concept) properly belongs" as well as his underlying understanding of the nature of war as outlined in books 1 and 8.

24. Categorizing the concept by a "book 6" and "book 8" distinction is not to suggest that Clausewitz was schizophrenic. Instead, it is to allude to the creative tension that was highlighted in the opening paragraph of this research paper. Beyerchen attributes this tension to the nonlinear nature of war. However, unlike Beyerchen who describes the COG as a linear concept, this paper posits that the concept that Clausewitz had in mind, à la book 8, shared the same nonlinear foundations as the rest of his masterpiece.

25. John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt Brace Jovanovich, 1965). Some view these inconsistencies as another reason to debunk the whole concept. Based on the experience in other social sciences, I submit that doing so will be throwing out the baby with the bath water. One is reminded for

instance that even interpretations of great works such as Keynes's seminal work which started the whole field of macroeconomics, continue to elude modern commentators. Some economists would call themselves "chapter 8—Keynesians" and argue that the modern economy is characterized by amorphous "animal spirits" that are driven by market and consumers' expectations and confidence. Others see the Keynesian theory as more deterministic: more government expenditure means more economic growth, *ceteris paribus*. Neither camp would however reason that Keynesian ideas should be ignored in entirety.

26. This list is by no means exhaustive, but it does represent the main spectrum of definitions from which other definitions can be derived.

27. Note that the latest version (1997) of Fleet Marine Force Manual (FMFM) 1, *Warfighting*, has aligned the Marines' understanding of the COG with the definition adopted by JP 3-0, *Joint Operations*. It has instead introduced an additional concept of critical vulnerabilities to illustrate the essence of maneuver warfare. Still, the idea of viewing centers of gravity as critical vulnerabilities has a long tradition in the Marines, as well as various military authors such as Robert Leonhard, John A. Warden III, and a long list of maneuver warfare theorists, such as William S. Lind, Steven Canby, and Pierre Sprey. The older definition is therefore retained for the purposes of this discussion, as it probably still reflects a popular definition held by many operational planners and military analysts.

28. Martin van Creveld, *Air Power and Maneuver Warfare* (Maxwell Air Force Base [AFB], Ala.: Air University Press, 1994), 3. Van Creveld is an example of professional analysts who adopt a similar definition in their writings.

29. Jeffrey E. Thieret et al., "Hit 'em Where It Hurts: Strategic Attack in 2025," *White Papers*, vol. 3, bk. 1, *Power and Influence: 2025* (Maxwell AFB, Ala.: Air University Press, November 1996), 174; and Jason B. Barlow, *Strategic Paralysis: An Airpower Theory for the Present* (Maxwell AFB, Ala.: Air University Press, 1994). In recent years, some writers have adopted such definitions as center of value or locus of value. The idea of denoting COG as anything that the enemy holds dear or values is not incompatible with the classes of definitions but it is too encompassing to be useful for separate treatment and discussion in this research paper.

30. Even though definitions 3, 4, and 6 do not explicitly use the term "sources of strength," the underlying ideas are similar. Consequently, they are grouped under the same category.

31. *Ibid.*

32. See for instance works by maneuver warfare theorists like Michael Lind, Robert Leonhard, and Israeli analyst Shimon Naveh, including earlier versions of *Warfighting*.

33. Joe Strange, *Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language*, Perspectives on Warfighting Series no. 4 (Quantico, Va.: Marine Corps Association, 1996). Doctor Strange has extensively argued this point in this occasional paper.

34. Wayne P. Hughes Jr., "Naval Maneuver Warfare," *Naval War College Review*, Summer 1997, 25–44. This point is well argued, albeit from a naval perspective, and Captain Hughes also warned that both maneuver warfare and attrition warfare can be successful styles of warfare, depending on the context.

35. Edward Mann, "One Target, One Bomb: Is the Principle of Mass Dead?" *Airpower Journal*, Spring 1993, 35-43; and Kurtis D. Lohide, "Desert Storm's Siren Song," *Airpower Journal*, Winter 1995, 100-110.

36. Shultz, 365.

37. K. Phillips Giles and P. Thomas Galvin, *Center of Gravity: Determination, Analysis, and Application* (Carlisle Barracks, Pa.: Center for Strategic Leadership, Army War College, 31 January 1996), 13.

38. See the discussion titled "In the Beginning—Clausewitz's Center of Gravity," which gives a fuller account of the differences.

39. Its importance is further discussed in Proposition #2 at the heading "One or Many."

40. Indeed, subsequent revisions in the Marine Corps doctrinal publications have led to positive steps being taken in the latest edition of *Warfighting* (20 June 1997), 45-46, to avoid the confusion of treating centers of gravity as critical vulnerabilities. It will take some time before changes in doctrine publications permeate the thinking of the entire Marine Corps. Meanwhile, appreciation of these differences will be essential.

41. Clausewitz, 617.

42. There are two further arguments in support of the single-COG concept that need to be debunked. The first argument finds its support not by virtue of the physical analogies but in the need to focus limited combat power on one single effort. The crux in this case is to ask whether the critical nodes of the enemy are a function of our available combat resources. If the answer is negative (as this author believes it to be), a better way to address the concern of constrained resources is not to ignore the existence of other COGs but to acknowledge that there is a need to engage the multiple COGs sequentially, one at a time. The alternative is to search for the elusive single silver bullet that military history warns is likely to be more of an illusion than reality. The second argument claims that multiple COGs can exist because of the different levels of war (i.e., tactical, operational, and strategic), but there can only be one COG at each level of war. This argument is seemingly more sophisticated but it is a red herring. Besides the fact that the levels of war are not inherently distinct categories but often overlap, the contention remains that there is no a priori reason why there should be only one COG at each level of war. Many of the points raised in the preceding discussion remain pertinent to counter this popular fallacy.

43. Giles and Galvin. While this appears to be an obvious conclusion, these authors in their study continue to assume that there is only one center of gravity.

44. William M. Mendel and Lamar Tooke, "Operational Logic: Selecting the Center of Gravity," *Military Review*, June 1993, 25. It is tempting to say that the destruction of the center of gravity will lead to immediate victory. In some special cases, this silver bullet strategy may exist. In most cases, however, such a criterion will be too stringent as the enemy will inevitably display greater persistence through its ability to react to friendly attacks. A more realistic end-state of concentrating our subsequent efforts at the next higher level of war is therefore adopted. Mendel and Tooke make a similar point.

45. Michael R. Gordon and Bernard E. Trainor, *The Generals' War: The Inside Story of the Conflict in the Gulf* (Boston: Little, Brown and Co., 1995), 234.

46. Phillip Meilinger, *10 Propositions Regarding Air Power* (Washington, D.C.: Air Force History and Museums Program, 1995). See the fourth proposition, which begins "In essence, Air Power is targeting."

47. Naval Doctrine Publication (NDP) 1, *Naval Warfare*, March 1994, 35.

48. Dennis M. Drew, "Joint Operations, The World Looks Different from 10,000 Feet," *Airpower Journal*, Fall 1988, 7-12; and Joseph C. Wylie, *Military Strategy: A General Theory of Power Control* (New Brunswick, N.J.: Rutgers University Press, 1966), 67. Admiral Wylie made a similar point that resonates today when he wrote, "There is yet no accepted and recognized general theory of strategy . . . [that] absorbs within its conceptual framework the realities of the existing specific concepts of war strategy, the continental, the maritime, and the air theories." (Emphasis added)

49. John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Air Power in the Aftermath of the Gulf War*, eds. Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. (Maxwell AFB, Ala.: Air University Press, July 1992), 64.

50. Naveh; and John Arquilla, "The Strategic Implications of Information Dominance," *Strategic Review*, Summer 1994, 28. Using a systems approach focusing on information and examining nations as entities that attack components of their enemy, this view holds that information becomes the factor on which the outcome of a conflict depends. Another interesting account of differing theories of war leading to different concepts of centers of gravity is given by Naveh, who contrasts the different understandings of *Schwerpunkt* between the blitzkrieg way of war, the Soviet concept of *vnezapnost*, and the evolution of the AirLand Battle doctrine. Naveh's land-theater examples are noteworthy as they suggest that differences can arise within the same service and also warns military historians that the use of a common term such as the center of gravity can have very different connotations when the theories of war differ substantially.

51. Strange.

52. Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War"; and Pat A. Pentland, "Center of Gravity Analysis and Chaos Theory," research report (Maxwell AFB, Ala.: Air War College, April 1993).

53. Timothy D. Hoyt, "Iraq's Military Industry: A Critical Strategic Target," *National Security Studies Quarterly*, Spring 1998, 33-50.

54. Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," 84.

55. Schneider and Izzo, 50.

56. Eliot Cohen, *Gulf War Air Power Survey (GWAPS)*, vol. 1, *Planning and Command and Control* (Washington, D.C.: Government Printing Office, 1993), 2. The Gulf War is especially useful as a historical case study on the employment of centers of gravity as the Central Command, as well as the coalition planners, made explicit use of the concept in the planning processes.

57. Otto Friedrich, ed., *Desert Storm: The War in the Persian Gulf* (Boston: Time Warner, 1991), 40.

58. DOD Interim Report to Congress, 4-2.

59. U.S. News & World Report Staff, *Triumph without Victory: The Unreported History of the Persian Gulf Conflict* (New York: Times Books, 1992), 266.

60. Colin Agee, *Peeling the Onion: The Iraqi's Center of Gravity* (Fort Leavenworth, Kans.: SAMS, 1992), 26-27.

61. John A. Warden III, *Air Campaign: Planning for Combat* (Washington, D.C.: NDU Press, 1988), 9-10.

62. GWAPS, 192. The correspondence between the expanded list of the Air Force objectives and the perceived centers of gravity was clearly seen by General Horner's Operations Plan 1002-90 briefing to General Schwarzkopf in April 1990. The briefing slide gave an explicit matching between the objectives and the centers of gravity (target sets).

63. Publication of Warden's theoretical assumptions only took place after the Gulf War, which must have added to the confusion during the Gulf War.

64. Richard Szafranski, "The Problems with Bees and Bombs," *Airpower Journal*, Winter 1998, 96.

65. *Ibid.*

66. John A. Warden III, "Success in Modern War: A Response to Robert Pape," *Security Studies* 7, no. 2 (Winter 1997/1998): 182.

67. Phillip S. Meilinger, "Air Targeting Strategies: An Overview," *Air Power Confronts an Unstable World* (London: Brassey's, 1998), 72.

68. Strange, 93.

69. Robert Jervis, *System Effects: Complexity in Political and Social Life* (Princeton, N.J.: Princeton University Press, 1997). Jervis provides an insightful account of how nations react as organic systems in international relations.

70. Beyerchen, "Clausewitz, Nonlinearity, and the Unpredictability of War," 87; and Ervin Laszlo and Alexander Laszlo, "The Contribution of the Systems Sciences to the Humanities," *Systems Research and Behavioral Science*, January-February 1997, 5-20. To say that we should view things as a whole is not to denigrate the importance of a reductionist approach. Both holistic and reductionist approaches have a place in dealing with complex problems. However, given our ingrained inclination for the reduction of complex problems, leading to what Beyerchen calls "our truncated expectations of the theory of war," special emphasis should be given to the need for understanding systems in its entirety, rather than in parts. As systems theory reminds us, there are emergent properties that are marked by the appearance of novel characteristics exhibiting on the level of the whole ensemble, but are not by the components in isolation.

71. Richard Hallion, *Air Power Confronts an Unstable World* (London: Brassey's, 1997), chap. 3. I am indebted to Col Phillip Meilinger for this observation from his essay "Air Targeting Strategies" published in Hallion.

72. John A. Warden III, "Employing Air Power in the Twenty-first Century," in *The Future of Air Power in the Aftermath of the Gulf War*, eds. Richard H. Shultz Jr. and Robert L. Pfaltzgraff Jr. (Maxwell AFB, Ala.: Air University Press, 1992), 57-82. The idea of parallelism is broader than the application of airpower. For instance, decisive results during the Bosnian conflict in 1995 were secured only through the parallel and synergistic employment of diplomatic and military power.

73. William S. Lind, *Maneuver Warfare Handbook* (Boulder, Colo.: Westview, 1985), 112. This quote originated from one of Colonel Wyly's lecture to the Amphibious Warfare School in 1981, when he was head of the Tactics Department.

74. *Ibid.*, 105-6.

75. *Ibid.*, 117.

76. *Ibid.*, 71.

77. *Ibid.*, 102.

78. *McGraw-Hill Encyclopedia of Science and Technology*, vol. 3, 507. It is interesting to note that the "strategic helix" finds its corollary in the way our human body tackles the problem of defending against a wide array of possible invaders. Loosely speaking, when a hostile bacterium or virus enters the body, defense strategies are generated at random until a feedback loop indicates that the correct strategy has been found. The great challenge is therefore to mimic nature and to find new and useful ways to harness chaos.

79. Barry D. Watts, *Foundations of U.S. Air Doctrine: The Problem of Friction in War* (Maxwell AFB, Ala.: Air University Press, 1984), 117. Clearly, it is conceivable that the greater the experience of the planner and the campaign commander, the tighter will be the helix and the shorter will be the path to the true center of gravity. The emphasis on battle experience when operating under the complexities of war is well laid out by Watts.

80. This emphasis on tempo clearly resonates with John R. Boyd's concept of observe, orient, decide, act (OODA) loop.