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Abstract

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Where You Sit and Centers of Gravity:
Bridging the Gap Between Army and Air Force Perspectives

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

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

Signature:_____

2 March 2004

Introduction: The Center of the Problem

Since its inception in Carl von Clausewitz's monumental and defining military theory manual, *On War*, the concept of a military center of gravity in both offensive and defensive operations has emerged as one of his most important theoretical constructs in waging war. Although Clausewitz was not instantly popular, or well-understood, by contemporary American military leaders, his influence today is the most far reaching of any military theorist, modern or historic. Identifying and acting upon an enemy's center(s) of gravity while effectively protecting one's own has come to be codified as an essential element in operational planning.¹ Although the conceptual idea of visualizing an enemy as a physical object predicated upon "a hub of all power and movement"—its center of gravity—is appealing to the would-be military scientist, the ineluctable reality that war is as much or more an art than a science has led to considerable confusion over what actually constitutes a center of gravity.²

Rather than focus on pedantic notions of what Clausewitz meant by center of gravity, this monograph seeks to examine how the United States Army and Air Force have traditionally come to define centers of gravity. Although both services accept the operational validity of defining friendly and enemy centers of gravity, between them there exist significant divergences of doctrinal opinion as to what truly constitutes a strategic enemy center of gravity; such inconsistencies can be deleterious during joint operations resulting in inefficiencies, misunderstandings, and even defeat. These differences originate generally from service culture, tradition, and experience and specifically from the Army's focus on a traditional Clausewitzian notion of the enemy armed forces as a center of gravity and the Air Force's historic emphasis on the capabilities of strategic bombing. In order to understand

and overcome conceptual differences in center of gravity thinking, a brief overview of Army doctrinal ties to Clausewitz's concepts followed by a slightly more extended review of the center of gravity-related perspectives of early and modern air power theorists is offered. To put these differences in an operational perspective, a brief examination of center of gravity issues during Operation Allied Force, the 1999 NATO operation in the former Yugoslavia, is also presented. The monograph concludes with recommendations regarding how to ensure joint unity in the context of divergent opinions regarding centers of gravity.

Army and Air Force: Center of Gravity Convergence and Divergence

What is accepted as the most definitive source for the U.S. military, *Joint Publication 3-0, Doctrine for Joint Operations*, identifies a center of gravity as, “those characteristics, capabilities, or sources of power from which a military force derives its freedom of action, physical strength, or will to fight.”³ The reader may note that this definition specifies a ‘military force’ instead of the theoretically broader intent of Clausewitz who more aptly referred to the ‘enemy’ and considered such elements as “the armed forces, the country [territory], and the enemy’s will.”⁴ Salient to this study, both the current Army and Air Force definitions are exact repetitions of the Joint version except that the Air Force qualifies the definition with an amendment stating that centers of gravity “exist at the strategic, operational, and tactical levels of war.”⁵ In theory then, the Joint Staff, Army, and Air Force all define center of gravity in the same terms. There is, however, a vast chasm of interpretation that separates uniform center of gravity theory from uniform application.

Army practice is more strictly rooted in Clausewitzian theories, perhaps because the underlying principles of conflict between ground armies have been relatively timeless, changing but little since *On War* was written, despite an enormous evolution in technology

and organization to increase effectiveness. Clausewitz himself invariably emphasizes engagement with the enemy force as a preliminary condition to securing political goals during a conflict. For example, in discussing the sequence of action for attaining his “three broad objectives” of subjugating the armed forces, the country, and the enemy’s will, he posits, “Since of the three objectives named, it is the fighting forces that assure the safety of the country, the natural sequence would be to destroy them first, and then subdue the country.”⁶ Army doctrine emphasizes this same premise: “Land combat continues to be the salient feature of conflict. It usually involves destroying or defeating enemy forces or taking land objectives that reduce the enemy's effectiveness or will to fight.”⁷ Thus the Army is likely to see the progression from tactical victories conceived to secure operational objectives which then culminate in strategic effects. It is generally difficult and dangerous for a large ground force to neglect an enemy army in search of directly obtaining a strategic objective. Enemies are not normally oblivious to strategic implications of important objectives and take positive actions to defend them. As a ground army bypasses enemy forces it risks tenuous lines of communication, envelopment, and destruction in detail if it either cannot secure the strategic objective before the enemy army has time to maneuver adequate forces into position or if the attainment of the strategic objective does not lead to the end of conflict.⁸

Dr. Joe Strange effectively argues that there typically exist multiple centers of gravity, and that “several *traditional* examples of a potential center of gravity include an enemy army or air force...national will, or an alliance.”⁹ Clausewitz offers the following assertion as an “unequivocal statement”: “Destruction of the enemy forces is the overriding principle of war, and, so far as positive action is concerned, the principal way to achieve our object.”¹⁰ The only way to rectify this statement with the importance he places on

identifying a center of gravity is to accept the enemy force as a ‘traditional’ center of gravity during virtually all armed conflict. This is not unreasonable since without an enemy force, organized armed resistance evaporates and it becomes decidedly more probable, though not a foregone conclusion, that a nation can impose its will upon the enemy. Clausewitz often emphasizes this traditional military center of gravity “against which all our energies should be directed” at the expense of a unique state-specific center of gravity: “Still, no matter what the central feature of the enemy’s power may be—the point on which your efforts must converge—the defeat and destruction of his fighting force remains the best way to begin, and in every case will be a very significant feature of the campaign.”¹¹ There is, then, a strong theoretical foundation to the Army’s assertion that, “Ultimately, it is the ability of Army forces to close with and destroy the enemy that allows the Army to dominate land operations.”¹²

The Air Force concept of centers of gravity may have been formed from the clay of Clausewitzian theory, but it has been sculpted into a unique image by air power proponents such as Giulio Douhet, William “Billy” Mitchell, and, more recently, John Warden. Douhet and Mitchell were both staunch proponents of “the third branch of the art of war—aerial warfare” and nurtured a political agenda to create a separate, independent air force within their respective countries.¹³ Both of these early air power advocates saw in air power the ability to avoid the devastating attrition warfare of World War I that had so shocked their audiences. In this context, had they proposed using aircraft merely as an effective means to attack enemy forces they may have been left without a constituency; thus modern air theory was conceived under the notion that it must do something beyond attrition warfare.

While it is true that the Army was the first U.S. service to codify the Clausewitzian concept of center of gravity, arguably the Air Force was the first branch to adopt it in practice.¹⁴ Strategic attack, air power's counter to the center of gravity, rests on the underlying assertion that air power must be centrally controlled and not parceled. This is commensurate with the fundamental premise of Clausewitz's center of gravity, concentrating force at the decisive point, and is the *raison de'etre* for an independent air force. The ability to determine priorities can be viewed as somewhat of a 'sovereign right' of an independent military service, and Douhet's assertion that "maximum returns from aerial offensives must be sought beyond the field of a battle" stands at the very heart of the justification for an independent air force.¹⁵

If the enemy army is a traditional center of gravity for the army, the enemy air forces are equally so to the air power theorists. Douhet claimed, "To conquer the command of the air means victory; to be beaten in the air means defeat and acceptance of whatever terms the enemy may be pleased to impose."¹⁶ Douhet's bold statement has not been attenuated by modern airmen; Warden proclaimed "no country has won a war in the face of enemy air superiority...no state has lost a war while it maintained air superiority".¹⁷ To Douhet, air superiority would have the impact of protecting friendly centers of gravity from enemy air attack while virtually assuring victory. Air superiority was, however, only a means to an end—the ability to carry out an unmolested campaign of strategic bombing. Douhet's true generic strategic center of gravity, to be pursued once air superiority had been ensured, was the "material and moral resistance of the enemy."¹⁸ He envisioned attacking the "vital centers" of an enemy's industry thus simultaneously robbing him of the means to produce the weapons of war and creating terror among the civilian population.¹⁹

Mitchell, who may have had ethical concerns with Douhet's preoccupation with indiscriminate bombing (or feared that the American people might), advocated the bombing of "centers of production of all kinds, means of transportation, agricultural areas, ports and shipping; not so much the people themselves."²⁰ That air power could strike any target within an enemy's territory meant that attacking the enemy army was only of secondary importance: "No longer will the tedious and expensive processes of wearing down the enemy's land forces by continuous attacks be resorted to."²¹

After inconclusive performances by air power during World War II and Vietnam, and in the name of joint operations, in the 1980s the Air Force moved further away from the concept of strategic bombing. Under the tutelage of the Tactical Air Command, at that time the most powerful community in the Air Force, the service wholeheartedly subscribed to the Army's concept of AirLand Battle.²² The establishment of a Deputy Directorate for Warfighting Concepts within the Air Staff Directorate of Plans headed by Colonel John A. Warden was a reaction by traditional air power enthusiasts to counter "what they felt was too great a departure from theories of independent air power."²³ As a result of his role in laying the foundation for the initial 'air campaign' during the Gulf War of 1991, Warden arguably became the most influential air power theorist since "Billy" Mitchell.

Warden, a student of Clausewitz, openly adopted (or manipulated, as some might argue) the concept of center of gravity in his writings.²⁴ He stepped away from traditional ideas of bombing economic targets and focused on identifying centers of gravity at various levels of war. Still recognizing the critical importance of freedom in the air, at the operational level he identified specific "air center[s] of gravity" to ensure that air superiority could first be obtained.²⁵ His generic center of gravity at the operational level beyond air

superiority was command and control: “Command is a true center of gravity and worth attack in any circumstance in which it can be reached.”²⁶ At the strategic level, Warden introduced a Five Ring Model which partially plays upon and partially supplants the notion of a center of gravity. Four concentric rings labeled Fielded Forces, Population, Infrastructure, and System Essentials encircle the ‘bullseye’ of the target center—Leadership. In this model, the further away from the center, the more difficult and less valuable the targets are to conclusively attack. Warden combined the five rings with his concept of parallel warfare which advocates disabling important nodes in each of the rings at one and the same time.²⁷ Again, using this model, command and control—labeled Leadership at the strategic level—is the de facto center of gravity in virtually all circumstances. The conclusion that this thinking precipitates is that every nation-state has generic centers of gravity, with the implication that these known centers are applicable to any conflict by tailoring target lists that effectively attack them—there is virtually no need to identify unique strategic centers of gravity.

That there are convincing arguments that Warden’s concept of a center of gravity is not in keeping with its Clausewitzian foundation is not the issue here.²⁸ The salient point is that his ideas are profoundly integrated into the thinking of the Air Force. In its section on strategic attack, *Air Force Basic Doctrine* lists three of the five rings as examples of centers of gravity (leadership, population, and fielded forces) suitable for targeting and concludes by emphasizing the unequivocal importance of attacking command and communications:

*Regardless of the nature of the adversary, disrupting the ability to communicate can be a critical step toward achieving strategic paralysis and disunity by cutting off the enemy’s political/military leadership from the civilian populace (or in case of non-state adversaries, their clandestine base of support) and fielded force. Whether one uses aircraft, missiles, or information attack, the enemy’s C2 should always be a target of particular focus in strategic attack.*²⁹

Since strategic attack equates to an attack on an enemy center of gravity (described in this instance as “an adversary’s sources of strength and will”), it is clear that Warden’s ideas of ‘traditional’ centers of gravity have become doctrinal premises for the Air Force.³⁰

Operation Allied Force: Manifestations of the Problem

Armed with a theoretical underpinning of the nature and origins of conceptual center of gravity biases between Army and Air Force commanders, it is helpful to overlay theory on reality in understanding how these inherent differences can affect joint efforts. Operation Allied Force presents a good case study for analysis as it is recent yet well-documented, and both the overall commander and the air component commander were outspoken regarding their perceptions. It should be noted at the outset that there were certainly formidable and unique political restrictions on commanders during Allied Force that perhaps even surpassed interservice conceptual differences and, in any case, one case study is an insufficient basis for conclusion. Allied Force does, however, provide a compelling illustration of a recurrent problem, which can subsequently be identified in other contemporary campaigns, and it vividly shows the loss of effectiveness when scarce resources are divided among ill-conceived or competing centers of gravity.

On March 24, 1999 after the breakdown of diplomatic negotiations with Serbian leadership at Rambouillet, France over the growing conflict between Serb forces and the Kosovo Liberation Army, NATO formally launched an air campaign ostensibly designed to “guarantee Kosovo’s political autonomy and provide security for its people.”³¹ Notwithstanding the long lead up to a military campaign and the recent historical experience in dealing with the Balkans in general and Serbian leader Slobodan Milosevic in particular, the U.S. and NATO were wholly unprepared for a decisive military response to the

breakdown in negotiations at Rambouillet.³² From the outset it appears that the U.S. and its allies expected that a mere demonstration of resolve would be enough to rein in the Serbs and nearly everyone shared in the expectation that air strikes would last “only a few days—a couple of weeks at the outside.”³³

The war began with only 214 U.S. aircraft committed to the campaign and 50 pre-approved military targets.³⁴ By the time it ended, that force had been increased to 731 U.S. aircraft which, along with allied partners, dropped some 28,000 munitions over a 78 day period making it the “most intense and sustained military operation in Europe since World War II.”³⁵ The air operation was designed around three phases: Phase 1 was to degrade the integrated air defense system over the whole of Yugoslavia in order to establish air superiority, Phase 2 was to attack military forces on the ground in Kosovo and Serbia, and Phase 3 was an expansion of operations to attack high-value military targets throughout Yugoslavia.³⁶ Due to political constraints imposed by NATO members, Phase 3 was never approved and a semblance of a true strategic bombing campaign only partially materialized after the NATO summit in Washington on April 23 when the target list was expanded to include “military-industrial infrastructure, media, and other strategic targets.”³⁷ The choice to concentrate on using aircraft for direct attack and interdiction missions on Serbian ground forces was only partially the result of a reluctance of some NATO member-states to attack strategic targets. In a press conference early in the operation, the Supreme Allied Commander, Europe (SACEUR), General Wesley K. Clark, made his priorities clear:

The military mission is to attack Yugoslav military and security forces and associated facilities with sufficient effect to degrade its capacity to continue repression of the civilian population and to deter further military actions against its own people. We are going to systematically attack, disrupt, degrade, devastate, and ultimately destroy these forces and their facilities and support . . .³⁸

Part of his decision was based on responding to the renewal of ethnic cleansing by the Serbs which was resulting in atrocities and threatening a massive refugee crisis.

Throughout the operation, General Clark recognized that multiple centers of gravity might exist, but he made his emphasis clear:

On the strategic level, we continued to push for approval to attack the strategic communications targets, including TV stations, key bridges, and electric power stations—high-profile elements of Milosevic’s system for command, control, and sustainment of the Armed Forces in Yugoslavia. That was one center of gravity. But the Serb ground forces were another center of gravity, and they were the top priority.³⁹

Clark could palpably detect a reluctance of his Air Force commanders to support his portrayal of Serb forces as the primary center of gravity and noted that there was an ‘inertia’ to be overcome: “Problems with weather, with massing aircraft, or with the threat from Serb antiaircraft systems always seemed more troublesome when the object was to attack the ground forces than when it was to attack the strategic targets.”⁴⁰ This led to further reiteration of his selected center of gravity to his commanders: “Do you understand that attacking the Serb forces on the ground is my top priority?”; “We’re going to win or lose this campaign based on how well we go after the ground targets.”⁴¹ Clark admitted that the result of such fundamental differences of opinion manifest itself in dysfunctional ways: “Many times I found myself working further down into details than I would have preferred, in an effort to generate the attack effectiveness against the ground forces that I knew we needed.”⁴² One can speculate as to how this involvement in tactical matters was received by his subordinate Combined Force Air Component Commander (CFACC), Lieutenant General Michael Short, whose doctrine pronounces as its first tenet that “*Air and space power must be controlled by an airman who maintains a broad strategic and/or theater perspective in*

prioritizing the use of limited air and space assets to attain the objectives of all US forces in any contingency across the range of operations.”⁴³

General Short, for his part, did not accept Clark’s view on the strategic significance of Serb ground forces; “I never felt that the [Serb] 3rd Army in Kosovo was a center of gravity.”⁴⁴ True to his service heritage, Short credited strategic attacks in and around Belgrade as the reason for Milosevic’s eventual capitulation and intimated that “the massive and laborious tank plinking effort in Kosovo was in many ways a waste of airpower since, in his opinion, it did little to achieve NATO’s stated goals.”⁴⁵ Clark’s efforts to educate his CFACC on priorities was not lost on the airman who reflected that while accepting and meeting the SACEUR’s requirements for attacking his “No. 1 priority, which he expressed to me every day . . . I used the rest of my assets to attack that target set that I genuinely believed to be compelling.”⁴⁶ Short’s perspective on centers of gravity as an airman influenced by previous generations of air power theorists is most evident in the following statement:

It was not just apparent at the three-star level that we weren’t following the classic air campaign that we’d all learned at Maxwell. It was just as apparent at the captain and major level that we were not using airpower the way we would have wished to use it . . . airpower was not being used as well as it could be and the way you have been taught to use it.⁴⁷

The end result of this failure to clearly accept and plan on an achievable and commonly accepted center of gravity resulted in a split effort and a less than harmonious atmosphere that caused significant inefficiencies in the prosecution of the campaign. While one can blame political difficulties for steering the military leadership towards the ground forces as a center of gravity, it is incumbent on military leaders to educate their political superiors before a conflict on whether or not a contemplated political course of action is likely to be militarily feasible. As noted, in Allied Force, Clark determined at least two

centers of gravity: “In the air campaign I talked of our attacks on two ‘axes’—a strategic attack directed at Serb military and security targets, as well as Milosevic’s instruments of control in Serbia, and a tactical attack, directed against the forces of ethnic cleansing in Kosovo.”⁴⁸ Labeling one center of gravity a tactical target and leaving the other virtually amorphous only served to increase the fog and friction of the operation. In any event, the forces initially available were not sufficient for the existing conditions to effectively strike at both of these identified centers of gravity simultaneously and effectively.

Recommendations: Back to the Center

Thus far this monograph has attempted to show how the concept of a center of gravity is apt to be interpreted in light of the Army’s or Air Force’s capabilities, doctrinal underpinnings, and service traditions. Many previous efforts have adequately concluded that center of gravity nomenclature and understanding need to be clarified and sharpened in joint and service doctrines. While this is an admirable starting point, even if center of gravity concepts are better standardized and promulgated, service-based interpretations are likely to persist. In other words, even if the debate over exact definitions is successfully resolved, there is no reason to believe that differences of opinion on what an enemy center of gravity is and how to act on it will merely evaporate. There is nothing sacred about a center of gravity that the United States military should feel that it cannot modify it or discard it if it proves unwieldy and some have suggested such a course of action. This author believes that the conceptual basis of center of gravity theory is generally sound and productive at all levels of a campaign, though it is most difficult at the higher levels. In order to ensure unity of understanding, as well as unity of effort, some accepted commonalities in deciding centers of gravity are proposed.

Ground and air commanders must begin by understanding the perspective of their counterparts to include their traditional and theoretical conceptions of war and centers of gravity. In the final analysis, as one author astutely observed, “services tend to identify as enemy centers of gravity only those things that are within their sphere of influence and directly affect their mission accomplishment.”⁴⁹ The Air Force should understand that, by necessity, the “Army’s worldview is often limited to the immediate problem of enemy forces in front of them.”⁵⁰ Air commanders must also appreciate that, in most likely combat scenarios, American popular support is likely to be a vulnerable *friendly* center of gravity, and if air assets are not used to minimize the number of U.S. ground casualties, the overall effort may collapse before strategic attacks have had time to take effect. General Short, while advocating a strategic attack approach for air power, appreciated this dynamic well when he noted that it was not an effective use of airpower to engage ground forces “*if we don’t have an army in the field* [or] unless we have defined the opposing army in the field as a center of gravity.”⁵¹

Rather than introducing a doctrinal Procrustean bed that forces all services to think alike, it is more appropriate and realistic that commanders accept that there are generally several traditional centers of gravity and that a successful outcome may be obtained by effective and coordinated concentration on one or several of them or on a separate, nontraditional center of gravity as the case may be. In most circumstances, for example, each element of Clausewitz’s renowned paradoxical triangle of people-army-government is sufficiently critical as to attain the status of a center of gravity.⁵² Attacking one virtually always affects the others, but one may also stand out as more attractive than the others.

A vital consideration in selecting an enemy center of gravity is to recognize that even

if it has been correctly identified as a source of power, it may not be readily dominated. To avoid such quandaries, centers of gravity should be selected based on what Cruz calls “the dual test of validity and feasibility.”⁵³ Purists might argue that feasibility is not a valid criterion and that a center of gravity is not a vulnerability, but practicality instructs that identifying and striking at a center of gravity that is impervious to attack is a sure formula for defeat. This is not to say that one should seek to attack those targets that are easiest to attack, but identifying the center of gravity of a forest, for example, as the water needed for the trees to survive when all one has is a match is to miss the mark. If all centers of gravity that exist are impervious to attack, based on political constraints, resources available, or time factors, victory is not possible. In Kosovo, there was good theoretical support for considering Serb forces as both an operational and a strategic enemy center of gravity since their destruction would have removed the source of strength and power to carry out ethnic cleansing. Given the specific circumstances, however, air power in isolation was not likely to sufficiently subjugate the armed forces so as to lead to victory.⁵⁴ The reaction by the enemy was predictable:

The Serbs were able to preserve intact the vast bulk of their ground forces by dispersing them before the bombing began and by making extensive use of concealment, camouflage, and hardened underground shelters. They were also able to shield their forces from attack by locating them among civilian facilities and populations.⁵⁵

In this instance, air power was not a good match for the center of gravity emphasized, and, as a RAND study surmised, “Even though purely military targets were the primary focus of the NATO air campaign and accounted for the vast majority of weapons expended, the destruction and damage to military targets probably did not generate the major pressure for war termination.”⁵⁶ For Allied Force it was fortunate for NATO that a second center of

gravity received attention, although belatedly, and that additional resources were eventually made available. The lesson here for ground commanders is that they must be able to look beyond their preoccupation with ground armies in realizing air power's unparalleled potential to strike other centers of gravity well beyond enemy fielded forces, which generally constitute a difficult target to strike conclusively by air alone.

The next step to maximize effectiveness is for commanders to take a further step away from service notions of generic centers of gravity and seek a greater understanding of the unique circumstances of any given conflict. The nature of modern war entails tremendous military capabilities, complex and unconventional situations, and often excruciatingly precise political goals. In this environment, the military leader may not always be capable of adequately determining a strategic center of gravity in isolation. When time permits, the identification process should include interagency inputs and, to avoid problems of ethnocentricity, might even incorporate outside experts on the government, economy, society, and military of the enemy. Early air power theorists recognized the limits of their knowledge and argued that target selection (though admittedly not center of gravity selection) should be based on the analysis of civilian technical experts on the probable impact.⁵⁷ If a similar approach was incorporated in the early stages of planning, rather than just in selecting targets after the fact, it would at least make clear to military leaders the difficulties involved with attacking a selected center of gravity thus allowing them to tailor the forces or choose another center to obtain the desired result. As an example, leadership is a favorite Air Force center of gravity, but different countries have vastly different power structures. If country specialists successfully derive all of the necessary elements that constitute a leadership base—what Strange would call the critical capabilities associated with

it—it may or may not appear as an attractive option; in any case, commanders would have a much better understanding of the implications of selecting that as a center of gravity.⁵⁸

Whatever concept is applied, some critical analysis must be undertaken with a conscious effort to avoid service or military groupthink. This lesson was also illustrated in Kosovo—a senior RAND staff member identified and articulated it well:

. . . both SACEUR and CFACC were equally prone throughout Allied Force to remain wedded to excessively parochial views of their preferred target priorities, based on implicit faith in the inherent correctness of service doctrine....they might more effectively have approached Milosevic as a unique rather than generic opponent, conducted a serious analysis of his particular vulnerabilities, and then tailored a campaign plan aimed at attacking those vulnerabilities directly, irrespective of canonical land or air warfare solutions for all seasons.⁵⁹

A more careful analysis of the situation should have led to a decision to use other means (such as ground troops) if the center of gravity was seen as the fielded forces.

Finally, commanders should make provisions to assess the impact and change the emphasis on centers of gravity as needed. As a general rule one should avoid revising a strategic center of gravity since doing so violates the principle of concentration of effort over time which is an inherent part of the concept. The exception, however, occurs when it becomes subsequently evident that a chosen center fails either the validity or feasibility test; in other words, it is no longer or, more likely, never really was a “hub of all power and movement” that one might dominate.⁶⁰ This should not, however, prevent one from redirecting assets when from among multiple centers one specific center of gravity begins to weaken. In Allied Force, there was a gradual shift of emphasis towards Clark’s ‘strategic axis’ after it became obvious that attacks on fielded forces were not having the desired impact and that Serbian leadership was under growing pressure to end the bombing as a result of increasing damage to ‘dual-use’ infrastructure.⁶¹

Conclusion: The Future of the Joint Center of Gravity

Unlike the mechanical model which it seeks to emulate, a military center of gravity is clouded by incomplete information, the perceptions of a wide range of actors, cultural differences, and a host of other imponderables. In some instances it may even be a moving target changing its character amidst the confusing interactions of conflict. Notwithstanding the theoretical genius in Clausewitz's writings, he never addressed the synergies, capabilities, or limitations of joint arms even despite the immensely influential naval forces that existed in his own time. If the concept of a center of gravity can be flexible enough to accommodate the realities of modern joint warfare, it is a valid and invaluable tool for effective operational planning. To be an effective construct, however, center of gravity notions must be able to incorporate (or conclusively refute) current and future concepts such as effects based operations, parallel attack, and information warfare. If it cannot be wrested in any degree from purist notions of its Clausewitzian origin and meaning, then it should be abandoned in favor of new models; as with any theoretical model, it remains useful only to the extent that it is the servant of operational artists and not their master. In any case, however, other potential paradigms would likely not be immune to similar challenges. This monograph has portrayed how the Army and the Air Force tend to view the concept of center of gravity and where problems may arise as well as recommendations to mitigate common difficulties. The potential reward of a proper perspective on centers of gravity is a unity of effort that is able to fully leverage the varied and growing capabilities of the two services and their

counterparts in a synergy that will more fully harness the latent energy inherent in joint operations.

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Notes

¹ *Joint Pub 3-0*, for example, defines center of gravity and offers guidance as to how it is to be used in operational planning. Joint Chiefs of Staff, *Joint Pub 3-0: Doctrine for Joint Operations* (Washington, D.C.: Joint Chiefs of Staff, 2001), pp. III-22-23. Also note Milan Vego's warning that "Failure to determine the enemy's proper center of gravity would result in a deeply flawed plan for a major operation or campaign" from Milan Vego, *Operational Warfare*, (n.p., 2000), 307.

² Carl von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret (Princeton: Princeton University Press, 1989), 595.

³ *Joint Pub 3-0*, GL-5.

⁴ Clausewitz, *On War*, 90. Note the change in definition of center of gravity from its first usage in *Joint Pub 3-0* in 1993. This version used the definition of "that characteristic, capability, or location from which alliances, nations, and military forces derive their will to fight, their physical strength, or freedom of action" (Joint Chiefs of Staff, *Joint Pub 3-0: Doctrine for Joint Operations* (Washington, D.C.: U.S. Department of Defense, 1993) III-27. Despite tying centers of gravity to military forces only, the current version includes as examples: an alliance, national will, and national strategy—see *Joint Pub 3-0*, p. III-22. For information on the evolution of definitions of center of gravity in doctrinal usage, see Christopher W. Fowler, "Center of Gravity—Still Relevant After All These Years," (Carlisle Barracks, PA: United States Army War College, 2002).

⁵ U.S. Department of the Air Force, *Air Force Doctrine Document 2 (AFDD2) Organization and Employment of Aerospace Power*, (Maxwell Air Force Base, AL: Headquarters, Air Force Doctrine Center, 2000), 134.

⁶ Clausewitz, *On War*, 90-91.

⁷ U.S. Department of the Army, *Field Manual 3-0 (FM3-0) Operations*, (Formerly known as FM 100-5) (Washington D.C.: Headquarters, Department of the Army, 2001), sec 1-36.

⁸ See, for example, discussions on culmination in warfare in Vego, *Operational Warfare*, 341-363.

⁹ Joe Strange, "Centers of Gravity & Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language," (Quantico, VA: Marine Corps Association), 117. Italics added.

¹⁰ Clausewitz, *On War*, 258.

¹¹ *Ibid.*, 596.

¹² *FM 3-0*, sec 1-18.

¹³ Giulio Douhet, *The Command of The Air*, trans. Dino Ferrari (n.p.: Coward-McCann, Inc., 1942; reprint, Washington D.C.: Office of Air Force History, 1983), 69.

¹⁴ See John B. Saxman, "The Concept of Center of Gravity: Does it Have Utility in Joint Doctrine and Campaign Planning?" (Fort Leavenworth, KS: School of Advanced Military Studies, United States Army Command and General Staff College, 1992), 15.

¹⁵ Douhet, *The Command of The Air*, 126.

¹⁶ *Ibid.*, 28.

¹⁷ John A. Warden III, *The Air Campaign: Planning for Combat* (Washington, D.C.: National Defense University Press, 1988), 13.

¹⁸ Douhet, *The Command of The Air*, 98.

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¹⁹ Gian P. Gentile, *How Effective is Strategic Bombing? Lessons Learned from World War II to Kosovo* (New York: New York University Press, 2001), 11.

²⁰ William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power—Economic and Military* (New York: G.P. Putnam's Sons, 1925), 16-17.

²¹ Mitchell, *Winged Defense*, xv-xvi. This is an insightful reference to the issues of the day in advocating airpower as a means of preventing the stagnant warfare of World War I.

²² For more information on the genesis of AirLand Doctrine, see pp. 51-71 of John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982* (Fort Monroe, Va.: Historical Office United States Army Training and Doctrine Command, 1984).

²³ Gentile, *How Effective is Strategic Bombing?* 534.

²⁴ See, for example, Warden, *The Air Campaign*, p. 9. For a good discussion of how Warden's concepts misinterpret Clausewitz's intent, see Fowler, "Center of Gravity—Still Relevant After All These Years", 7-8.

²⁵ Warden, *The Air Campaign*, 40.

²⁶ *Ibid.*, 53.

²⁷ See John A. Warden III, "The Enemy as a System," *Airpower Journal* 9, no. 1 (Spring 1995): 40-55.

²⁸ Strange, "Centers of Gravity & Critical Vulnerabilities", 37-38.

²⁹ U.S. Department of the Air Force, *Air Force Doctrine Document 1 (AFDD1) Air Force Basic Doctrine*, (Maxwell Air Force Base, AL: Headquarters, Air Force Doctrine Center, 2003), 51-53. Italics added.

³⁰ *AFDD 1*, 50. Also note the following excerpts from pp. 50-51: "As a concept, strategic attack builds on the idea that it is possible to directly affect an adversary's sources of strength and will to fight without first having to engage and defeat their military forces....Employed properly, it offers the capability of going to the heart of the enemy sources of strength, avoiding prolonged attrition-based surface combat operations first."

³¹ Ivo H. Daalder and Michael E. O'Hanlon, *Winning Ugly: NATO's War to Save Kosovo*, (Washington, D.C.: Brookings Institute Press, 2000), 68.

³² This is not to say that advance planning had not been attempted; General John Jumper, the commander of United States Air Forces, Europe reported that "by the onset of Allied Force, no fewer than 40 air campaign options had been generated and fine-tuned," from Benjamin S. Lambeth, *NATO's Air War for Kosovo: A Strategic and Operational Assessment* (Santa Monica: Rand, 2001), 12. The problem was that the plans *adopted* never envisioned the type of effort and resolve eventually required to force Milosevic to accept NATO demands.

³³ *Ibid.*, 18. Air power advocates who were critical of the initial operational focus which seemed to be intent on 'sending a message' to Serb leaders revived the Vietnam War maxim that "if all one wishes to do is send a message, use Western Union." From Benjamin S. Lambeth, "Lessons from the War in Kosovo," *Joint Force Quarterly*, (Spring 2002): 19.

³⁴ Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile Campaign in Kosovo* (Westport, CT: Praeger Publishers, 2001), 20.

³⁵ Lambeth, "Lessons from the War in Kosovo," 12. The total figure of 731 U.S. aircraft involved by the end of the war is cited from *Report to Congress: Kosovo/Operation Allied Force After-Action Report* (U.S. Department of Defense, 2000), 32. The same report notes that over 300 allied aircraft were also dedicated by the end of the war.

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- ³⁶ Lambeth, "Lessons from the war in Kosovo," 24.
- ³⁷ Ibid., 25.
- ³⁸ Wesley K. Clark, *Waging Modern War: Bosnia, Kosovo, and the Future of Combat*, (New York: PublicAffairs, 2001), 203.
- ³⁹ Ibid., 242.
- ⁴⁰ Ibid., 245.
- ⁴¹ Ibid.
- ⁴² Ibid.
- ⁴³ *AFDD 1*, 33. Italics added.
- ⁴⁴ John A. Tirpak, "Short's View of the Air Campaign," *Air Force Magazine* 82, no. 9 (September 1999): 43.
- ⁴⁵ Ibid.
- ⁴⁶ Ibid., 43-45.
- ⁴⁷ Ibid., 47.
- ⁴⁸ Clark, *Waging Modern War*, 271.
- ⁴⁹ Saxman, "The Concept of Center of Gravity," 33.
- ⁵⁰ Seow Hiang Lee, "Center of Gravity or Center of Confusion: Understanding the Mystique," (Maxwell Air Force Base, AL: Air Command and Staff College, 1999), 14.
- ⁵¹ Tirpak, "Short's View of the Air Campaign," 43. Italics added.
- ⁵² The first discussion of this subject, which has become as significant in modern warfare as the concept of a center of gravity, is found in Clausewitz, *On War*, 89.
- ⁵³ Francisco N. Cruz Jr., "Strategy and Center of Gravity," (*Philippine*) *Air Force Review* 2, no. 2: 1; available from http://www.paf.mil.ph/af_review/vol02/STRAT&CG.HTM; Internet; accessed 28 December 2003.
- ⁵⁴ Regarding the difficulties of employing air power in Kosovo, General Short noted; "We lacked a ground element to fix the enemy, to make him predictable, and to give us information on where the enemy might be." As reported in Peter F. Herrly, "The Plight of Joint Doctrine after Kosovo," *Joint Force Quarterly*, (Summer 1999): 102.
- ⁵⁵ Stephen Hosmer, *The Conflict Over Kosovo: Why Milosevic Decided to Settle When He Did*, (Santa Monica: RAND, 2001), xxiii.
- ⁵⁶ Hosmer, *The Conflict Over Kosovo*, xiv.
- ⁵⁷ Gentile, *How Effective is Strategic Bombing?*, 18.
- ⁵⁸ Strange, "Centers of Gravity & Critical Vulnerabilities", 48-49.
- ⁵⁹ Lambeth, "Lessons from the War in Kosovo," 16. A similar comment was made by John Olsen regarding the Gulf War: "The air planners did not have any particular knowledge of the Iraqi regime, but they believed that bombing for strategic effect was universally applicable" from John Olsen, "Strategic Air Power and the Gulf War," in *Air Power History: Turning Points from Kitty Hawk to Kosovo*, ed. Sebastian Cox and Peter Gray (London: Frank Cass, 2002), 262.
- ⁶⁰ Clausewitz, *On War*, 595.
- ⁶¹ Hosmer, *The Conflict Over Kosovo*, 65-66. According to Hosmer, "Much of the impulse for this pressure seems to have resulted from NATO attacks on six types of fixed infrastructure targets—command, control, and communication (C³), electric power, industrial plant, leadership, LOCs, and POL facilities—the bulk of which were located in Serbia proper."