THE CENTER OF GRAVITY, SYSTEMICALLY UNDERSTOOD

A Monograph

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How does the U.S. military understand and apply the center of gravity concept in the contexts of theory, doctrine, and planning for the conduct of operations? In particular, does the center of gravity serve as an effective tool when applied in accordance with current military doctrine and other non-doctrinal methodologies, and how does its use help reveal causal relationships and account for the emergent properties of complex systems?

Academics and military practitioners have debated the meaning and usefulness of the concept of centers of gravity since Clausewitz introduced it in the early nineteenth century. In order to understand and apply the joint doctrine for operational design as described in *Joint Publication 5-0, Joint Operations Planning*, the military must come to a consensus on the meaning, uses, and applicability of centers of gravity. So far this consensus has not formed, and as time passes it appears even more elusive. With the U.S. Army currently undertaking a major reworking of its operational doctrine, an opportunity exists to clarify the concept and its practical application; otherwise the term could end up trapped in the same conceptual quagmire that led to the death of "Effects Based Operations" (EBO) as a joint doctrinal concept.

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ABSTRACT

THE CENTER OF GRAVITY, SYSTEMICALLY UNDERSTOOD, by Major Christopher M. Rowe, 57 pages.

How does the U.S. military understand and apply the center of gravity concept in the contexts of theory, doctrine, and planning for the conduct of operations? In particular, does the center of gravity serve as an effective tool when applied in accordance with current military doctrine and other non-doctrinal methodologies, and how does its use help reveal causal relationships and account for the emergent properties of complex systems?

Academics and military practitioners have debated the meaning and usefulness of the concept of centers of gravity since Clausewitz introduced it in the early nineteenth century. In order to understand and apply the joint doctrine for operational design as described in *Joint Publication 5-0, Joint Operations Planning*, the military must come to a consensus on the meaning, uses, and applicability of centers of gravity. So far this consensus has not formed, and as time passes it appears even more elusive. With the U.S. Army currently undertaking a major reworking of its operational doctrine, an opportunity exists to clarify the concept and its practical application; otherwise the term could end up trapped in the same conceptual quagmire that led to the death of "Effects Based Operations" (EBO) as a joint doctrinal concept.

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ACRONYMS

IIFFV	II Field Forces Vietnam
ARVN	Army of the Republic of Vietnam
COG	Center of Gravity
COSVN	Central Office for South Vietnam
C2	Command and Control
GPS	Global Position System
GVN	Government of Vietnam
LOC	Line of Communication
NVA	North Vietnamese Army
PME	Professional Military Education
RVNAF	Republic of Vietnam Armed Forces
SAMS	School of Advanced Military Studies
TRADOC	Training and Doctrine Command
VC	Viet Cong
U.S.	United States

INTRODUCTION

Since the 1832 publication of Prussian military theorist Carl von Clausewitz's *On War,* which introduced the center of gravity (COG) into the military lexicon, no consensus has emerged among U.S. military thinkers regarding the definition or practical application of the concept, or even what Clausewitz meant by the term when he coined it. Throughout *On War*, Clausewitz referred to the center or centers of gravity thirty-nine times, in various contexts and apparently with a range of meanings. His varied examples can lead the reader to ask whether the COG simply represents "the main battle" of any conflict or campaign, or the mass where the enemy "is most concentrated." Similarly, Clausewitz described the COG as a concept that could embody something other than a battle or a military formation, like the enemy's capital or a national leader.[1] More importantly, the reader should ask what the COG means to today's military practitioner. Perhaps the most common and simultaneously most vague definition appears in Chapter 4, Book 8 of *On War*:

> What the theorist has to say here is this: one must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed.[2]

According to current joint U.S. military doctrine, the military practitioner must identify this central hub and focus all efforts against it to cause "the defeat, destruction, neutralization, or substantial weakening" of an adversary causing it "to change its COA [course of action] or prevent an adversary from achieving its strategic objectives."[3]

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[1]Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984), 248, 485, 596

[2]Ibid., 595-596.

[3]Joint Publication 5-0, *Joint Operation Planning* (Washington, DC: Government Printing Office, August 2011), III-24.

In concept, this seems quite reasonable. The military has even developed a process to help identify friendly and enemy COG(s) – both strategic and operational – and the critical factors associated with each.[4] However, what if all the intellectual debates surrounding the COG and its true meaning have led the military down a road of confusion and reductionism, only to hit an intellectual dead end from which it cannot return? Has the idea that Clausewitz gave us outlived its usefulness? Has the military missed the boat in its attempts to harness the power of the COG? In short, is the center of gravity concept, as currently taught in military educational institutions, defined in joint doctrine, and understood by military practitioners adequate to meet the military's future needs at the joint and operational level?

Hypothesis

The military practitioner must think like a systems thinker – something that joint doctrine has encouraged for more than two decades. By viewing it through the lens of systems thinking, one can see that the COG will remain a fuzzy but still useful concept, best employed in the manner most appropriate to a given situation. While the COG offers no panacea, analyzing it offers much of value to the military practitioner. COG analysis provides a sense of understanding, a way to identify key elements of friendly, enemy, and noncombatant systems, logic for framing and reframing problems, and the foundation for a logical targeting process that achieves complementary lethal and nonlethal effects against the other's COG, while protecting one's own.

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[4]Joint Publication 5-0, III-22-25; Joint Publication 2-01.3, *Joint Intelligence Preparation of the Operational Environment* (Washington, DC: Government Printing Office, June 2009): II-65-68. Both Joint Publications describe COG(s), critical capabilities (CC), critical requirements (CR) and critical vulnerabilities (CV), hereafter referred to as "COG-CV analysis." This is a direct adaptation of the work of Dr. Joe Strange. Strange first offered this method of COG analysis in a monograph for the Marine Corps University circa 1996 and later with Richard Iron in a *Joint Force Quarterly* article circa 2003. Joseph L. Strange, *Centers of Gravity & Critical Vulnerabilities: Building on the Clausewitzian Foundation so That We Can All Speak the Same Language*, Quantico, Va.: Marine Corps University, 1996; Joseph L. Strange and Richard Iron, "Center of Gravity: What Clausewitz Really Meant," *Joint Force Quarterly: JFQ*. no. 35 (2003): 20-27.

Within the context of operational art, if staffs and commanders can find practical usefulness in COG analysis, the concept still has value. The following study demonstrates that the concept still possesses usefulness, although the risk does exist that the term could slip into cognitive obscurity or simply remain the topic of a never-ending debate. Therefore, the following analysis provides a reassessment of the term and its application in the context of operational art, demonstrating that by viewing the concept through the lens of systems thinking, the U.S. military can renew the usefulness that Clausewitz originally intended for the COG, and retain its relevance in current U.S. military doctrine.

METHODOLOGY

Systems Thinking Understood

As the world grows increasingly interconnected and therefore more complex, societies, governments, and organizations must continuously adapt to change in order to thrive. To accomplish this change, these systems must content with the increasing complexity they face by making themselves equally more complex – for example, by rejecting strict methods of hierarchical control in favor of more decentralized control. Decentralized control leads to a diffusion of responsibility from the individual to the group and helps to alleviate the single point of failure often found in hierarchical systems. Likewise, the complexity of a hierarchical system faces a logical limit imposed by the commander's personal abilities and shortcomings. If the commander can diffuse or decentralize the control throughout the organization, it can reach a higher level of complexity simply through making use of the capabilities of the many interconnected actors operating within the system. This diffusion affects the COG by shifting and possibly multiplying its effects. This makes it more difficult for an opponent to trace the COG "back to the fewest possible sources."[5] The difficulty underlying this approach to organizational

[5]Clausewitz, 617.

leadership results in the need to adopt a systems thinking approach. Through looking at any problem holistically, the military practitioner can see how all of the parts interact. The practitioner no longer takes a reductionist view in looking for the single causal mechanism. Instead, the practitioner understands and appreciates that multiple interdependent causal mechanisms work to affect the entirety of the system.

In his book *Making Things Work: Solving Complex Problems in a Complex World*, complex systems theorist Yaneer Bar-Yam identified four key characteristics of the systems thinking approach "that are often, if not always, useful" in the attempt to understand complex systems.[6] Since warfare by its nature involves a complex activity – or more accurately many interconnected complex activities, systems thinking often yields the best results when one studies war or conducts military operations. This applies when identifying and attempting to achieve effects against the enemy COG(s), or when defending one's own.

Current U.S. military doctrine references systems theory, but in an overly simplistic manner that does not account for several of the most important characteristics of complex systems, like spontaneous system adaptation and emergence.[7] This has led to a lack of clarity in both doctrine and practice. In particular, the shortcomings of current doctrine include a poor understanding of the COG, and an overly process-oriented approach to COG analysis. This has resulted in much debate about the meaning, application, and usefulness of the concept. To demonstrate that COG analysis does possess usefulness if understood as the complex, nonlinear phenomenon Clausewitz intended, Bar-Yam's four useful characteristics of systems thinking

[6]Yaneer Bar-Yam, *Making Things Work: Solving Complex Problems in a Complex World*, 1st ed. (Cambridge, Mass.: NECSI Knowledge Press, 2005), 15.

[7]Joint Publication, 2-01.03, II-45 – II-76; Joint Publication 5-0, III-25; TRADOC Pamphlet 525-5-500, *The U.S. Army Commander's Appreciation and Campaign Design* (Fort Munroe, VA: Government Printing Office, January 2008), 5; U.S. Army, Army Doctrine Reference Publication 5-0, *The Operations Process* (Washington, DC: Government Printing Office, May 2012), 2-4 – 2-11.

serve as criteria to help identify in the following case studies situations in which each commander did or did not correctly identify or achieve desired effects against the enemy COG(s), or protect the friendly COG(s).

Mechanisms of Collective Behavior (Patterns)

Mechanisms of collective behavior act as the patterns that develop through the interactions between individuals that make up the collective group.[8] These collective behaviors work together to define the group as a whole and how it operates. While one should account for individuals inside the group, the defining characteristics of the overall system arise from the collective behavior and interactions that occur between these individuals. For the military practitioner, the mechanisms of collective behavior are the institutional, historical, and behavioral processes that make up and define the military as a profession. The practitioner must take into account individual actions both on their own merit, and within the context of the behavior of the group of which that person is a part. Through these interactions, or collective behavior, patterns begin to emerge throughout the system. COGs exist at this collective level.

A COG, even if an individual, wields significant influence on group behavior – this influence makes the COG a particularly important component of a system, since achieving an effect against it will result in a system-wide effect. Thus, the military practitioner relies on analysis of the patterns and interactions within the system and between its individual components or personnel to identify the COG(s). Put simply, a COG bears significance within a system because it acts as a central component of it, and the condition of that COG directly affects the state of far more of its system than the part it directly occupies. Conversely, affecting the COG should reveal a change in the collective behavior of the system – this can serve as a test of sorts.

[8]Bar-Yam, 19.

One knows when operations have achieved effects on a COG because those effects manifest throughout the entire system – its patterns of collective behavior change.

Multi-scale Perspective

Paradoxically, complex systems exhibit self-similarly across scale – patterns but not predictability. The unique collective patterns these systems display stem from the emergence of collective properties when one combines the characteristics of a system at different scales – this results in a system's emergent properties. Building on the previous criterion, the following case studies show where the commanders managed to change the scope or scale of the problem they faced from the macro to micro level (or vice versa) as necessary to more effectively understand themselves and their adversaries. To understand clearly and appreciate the advantages of a multi-scale perspective, the military practitioner must understand two important concepts within systems thinking: emergence and interdependence.

Emergence, according to Bar-Yam, "refers to the relationship between the details of a system and the larger view. . .[I]t is concerned with the relationship between the two."[9] To use a common analogy, the military practitioner can achieve understanding by learning to see both the forest and the trees, and more importantly how they interact together to make the system work as a whole. In other words, one can know much about trees, but understand little about the forest within which the tree resides. In military parlance, the practitioner must understand what essential aspects of the operational environment will lead to a nuanced understanding of the overall common operating picture. For example, the systems thinker should consider how actions taken in one village or province in a country (system) like Afghanistan affect the overall campaign plan. The concept of interdependence couples with the idea of emergence. Interdependence speaks to

[9]Ibid., 27.

the connectedness of a system – like a society – writ large.[10] One person's actions in Kunar Province, Afghanistan may have repercussions in Kabul or elsewhere. The human race does not live in a mechanistic environment, but in an interconnected, ever-changing one. For example, humans rely on so many complex interconnections to live that no doctor can disassemble a human body and then reconnect all of the parts without killing the person in the process. The body simply exhibits too much complexity and interdependence among its individual parts, much like the operational environment in which the military professional operates.

The concepts of interdependence and emergence are particularly important when the practitioner attempts to decide when and where to act on the battlefield. A well-founded understanding of these two concepts enables the military practitioner to interact in the operational environment knowing that actions taken in one area may have intended or unintended consequences in another area. This knowledge serves as a vitally important factor when addressing actions toward a COG. A COG should have great significance to the actors in the system in which that COG exists, irrespective of scale. Observers seeking to understand a military system, whether friendly or enemy, should seek to understand the varying effects the COG has on the rest of the system of which it is part – only then can the observer understand its importance.

The Evolutionary Process that Creates Complex Systems

According to Bar-Yam, two key ingredients must exist for a complex system to arise and adapt: competition and cooperation.[11] Competition at the individual level leads to better individuals. Cooperation amongst the individuals then leads to better teams. Continuing the process, competition between teams leads to a better overall organization. Ultimately, the organization that survives is comprised of teams that compete against each other for the good of

[10]Ibid., 27-28.

[11]Ibid., 76-77.

the organization. As Bar-Yam notes, "Teams will improve naturally – in any organization – when they are better at cooperation. Winners of a competition become successful models of behavior for less successful teams, who emulate their success by learning their strategies and by selecting and trading team members."[12] A COG should act as a lever, enabling a commander to employ competition and cooperation to cause changes at the evolutionary level in both the friendly and the enemy system, while preventing the enemy from exerting a similar influence on the friendly COG(s). Having an effect on a system's COG should also lead to an effect on the evolutionary process through which that system exists, changes, and adapts. That is to say, affecting a COG could interrupt a system's normal process of adaptation, leading to excessive or unorganized complexity and eventual collapse.

Nature of Purposive or Goal-Directed Behavior

Every system or organization has a purpose. The system directs its efforts to achieve that purpose, at least partially, through its design and make-up – and it does so most effectively when guided by the leadership of a systems thinker. For example, the COG (friendly or enemy) serves as a critical component of the system's ability to achieve its goal through its actions or lack thereof. Therefore, if a commander can affect negative change in his adversary's COG (i.e. successfully attack the opposing commander's COG), that commander alters the adversary's system and its ability to achieve its desired goals. Additionally, effective actors clearly understand the purpose and goal of the system within which they exist. Subordinate members in the system must also understand the intent of their commander. Through a shared understanding of the overall goals and purpose of the system, the actors in one system can defeat their adversary system's COG.

[12]Ibid., 84-85.

The following case studies apply these principles in a number of situations, each of which occur in the context of a military campaign. The first case study examines the initial exploits of Alexander the Great as he attempted to conquer Asia Minor and defeat Darius III of Persia. The second case study analyzes Napoleon's attempt to conquer Prussia and greater Western Europe during 1806. The third case study revisits the U.S. Army's involvement in the Vietnam War. The final case study applies the criteria above to the First Gulf War. Demonstrating the universality of the systems-based foundation of the COG concept, two of these campaigns occurred before Clausewitz's writings and two took place long after the publication of *On War*.

ANALYSIS

Battles of Granicus, Issus, and Gaugamela

While the battles of antiquity present significant challenges to historians seeking to discern their particular details, there remain over-arching lessons that one may learn and examples that such campaigns represent to broaden the experiential base of the military practitioner. The early campaign of Alexander the Great against the Persian King Darius III from 334-331 BC offer one such example. During this period, Alexander provided his army with a clear purpose and end state: the pursuit and, ultimately, the defeat of the Persian King which would enable Alexander to conquer all of near-east Asia. The major land battles that took place during this campaign occurred at Granicus, Issus, and Gaugamela. The last, Gaugamela, remains perhaps the most remarkable of Alexander's victories for a multitude of reasons and serves as the primary battle around which this case study revolves. Before analyzing the particular events of the campaign, however, one should understand the context within which all of these battles occurred.

Before Gaugamela, Alexander defeated Darius and the Persian Army at every turn. Alexander and his predominantly Macedonian Army enjoyed numerical superiority at Granicus the first of the three key battles in his campaign to defeat Darius. The two armies fought on

ground chosen by the Persians. As historian Hans Delbrück wrote, "We have here a new phenomenon in the history of war: while the Persians, aware of their weakness, seek aid in the terrain, they choose a frontal obstacle in order to make the attack more difficult for the enemy." This is important for a few reasons. In the case of the Persians, this battle highlights their ingenuity in selecting defensible terrain – a position immediately behind a shallow river that would create disorder in any attacking formations as they crossed it. However, it also points out Darius' inability to use the terrain and his forces effectively in an integrated manner. This allowed Alexander to seize and retain the initiative. The river itself "was probably fordable at almost any point, but the right bank, on which the Persians were drawn up, was high and steep." Despite the significance of the terrain, the Persians attempted to defend, not with their infantry, but with their cavalry.[13] If Alexander were a systems thinker, Granicus would begin to highlight a couple of key features about his Persian enemy: despite the selection of advantageous terrain, the Persians attempted battle with what they believed to be their best soldiers, the cavalry; and, the Persians lacked a combined arms approach in that they also failed to properly employ their archers in the defense.

During the battle at Issus, the Persians outnumbered Alexander but still lost. While one might attribute Alexander's victory at Granicus simply to the use of overwhelming power and luck to his advantage, at Issus Alexander began to demonstrate his true military intellect – particularly what people today refer to as systems thinking. His selection of approaches to the actual battle and his arrayal of forces during its early stages serve to highlight how he and his army continued to evolve to meet their environment. During the battle, Alexander understood from his experience at Granicus that the Persians would attempt to use their cavalry as their

[13]Hans Delbrück, *History of the Art of War, Volume 1: Warfare in Antiquity*, trans. Walter J. Renfroe Jr. (Lincoln: University of Nebraska Press, 1990), 187-189; Arrian, *The Campaigns of Alexander*, trans. Aubrey De Sélincourt (New York: Penguin Classics, 1976), 69-75.

decisive force. To counter this, Alexander, numerically inferior and yet again on the opposite side of a river, correctly deduced that he could break the Persian army through overwhelming speed and initiative. He achieved a conceptual understanding of the battlefield based on the terrain and enemy force arrayal, and foresaw how it would unfold from both his perspective and that of the Persians. At Issus, no easy fording site existed within view, except where the river met the sea. The Persians chose this site as an avenue of approach for a cavalry strike against the Macedonian flank. In providing his enemy with a broad front to attack while simultaneously conducting a bold flanking maneuver, Alexander introduced more complexity than the Persians could cope with. Arguably, this defeat sapped a huge amount of morale from the Persian army, as evidenced by Darius's rapid flight from the scene of battle.[14]

The battle serves to highlight two further points: the Persians once again relied on their cavalry to deliver the decisive blow in battle; and, once Darius fled the field of battle, the Persian Army lost its will to fight. At this point, Alexander undoubtedly understood that the Persian Army relied heavily on its cavalry, and lacked direction and morale without the physical presence of its king. In short, Alexander learned that if he could defeat the Persian cavalry, he would defeat Darius, and if this led to Darius' retreat, he would defeat the entire Persian Army. However, decisive victory relied not just on taking the field, but destroying the enemy army so that it could no longer pose a threat. This meant Alexander had to find a way to make the Persian army stand and fight. For this, Alexander would not have to wait long. As historian Paul Cartledge pointed out, "The Issus disaster had taught Darius several lessons. One of the most important was that he must ensure not only that his forces were vastly larger than those of Alexander…but also that the battlefield was entirely of his own choosing and suitable in every particular for exploiting this

[14]Arrian, 115-121; Delbrück, 191-202

numerical superiority."[15] Once Darius believed he had achieved these goals, he would possess the resolve to see a battle with Alexander through to its end.

The battle of Gaugamela took place in the fall of 331 BC near present-day Nineveh, Iraq. While contemporary accounts and later historian's estimates of the specific numbers of troops in each army vary, consensus exists that the Persians significantly outnumbered Alexander during this battle. Moreover, Darius introduced a number of new elements to the battlefield to include additional cavalry, scythed chariots, and elephants. Finally, Darius selected the terrain again, and chose a wide, clear field well-suited to the use of these elements of his army. In his mind, this would allow Darius to capitalize on his use of cavalry to deliver the decisive blow.[16]

To account for the new elements of the combat environment, Alexander arrayed his forces in such a manner as to take full advantage of his own strengths, two particularly powerful combat formations known as the Companion Cavalry and the Foot Companions. As previously seen at the battles of Granicus and Issus, Alexander began the battle with his main effort, the Companion Cavalry, on his right wing and the Foot Companions in the center. His force arrayal differed mainly in the physical alignment of his infantry and the additional tasks his warriors had to accomplish. Facing a numerically superior enemy, one of Alexander's chief concerns revolved around the possibility that Darius might outflank his army, and the means by which he could prevent or respond to this possibility. Taking risk given his already low strength relative to the Persians, Cartledge noted, "Alexander . . . organized a second line of defense."[17] Should the Persians outflank the Macedonians, the second line of defense would turn to defend against the flanking maneuver. Additionally, as Alexander advanced, he began maneuvering his cavalry to

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[15]Paul Cartledge, *Alexander the Great* (New York: Vintage, 2005), 178-179.

[16]Arrian, 160-161; Cartledge, 179-180; Delbrück, 211-213.

[17]Cartledge, 180.

his right. This accomplished two tasks. First, it prevented Darius from outflanking the Macedonians. Second, it led to exactly the reaction from Darius that Alexander hoped for. In his care to keep a force between himself and Alexander's powerful cavalry, Darius allowed a seam to form in his army. As the battle raged on this seam grew, until Alexander sensed the right moment and rushed powerful cavalry units through it, penetrating to the Persian rear and once again routing Darius and triggering the collapse of his army. In this case Alexander took advantage of the element of surprise this maneuver achieved to exploit and ultimately rout the Persian army, achieving a decisive victory.[18]

This brief analysis of Alexander's early campaigns, demonstrates that he and his army exhibited key characteristics of a complex adaptive system. Additionally, Alexander himself exhibited systemic thinking in his approach to defeating the Persian Army. First, Alexander's army fought to achieve a clearly defined end state, the destruction of the Persian Army and Darius III. To accomplish this, Alexander seems to have realized that his army had to function as a system that could evolve from one battle to the next, executing his operational designs to the letter and thereby exceeding the complexity of the enemy system – Darius' Persian Army. Moreover, Alexander understood that to defeat the Persian Army in battle, he had to defeat its COG: its large and powerful cavalry contingent.

Alexander identified the Persian COG by observing the patterns Darius' army established during the first two initial battles – in particular, Darius' use of his cavalry in an attempt to deliver the decisive blow, regardless of terrain and other factors that might have made a different approach more effective. Alexander also learned that total collapse of the Persian Army soon followed disruption of its military leadership, particularly Darius, who maintained strict control through a handful of generals. As previously mentioned, a hierarchical system's complexity

[18]Arrian, 165-169; Cartledge, 180-181; Delbrück, 213-214.

depends on its leader. Darius, who did not lead his army like a learning, adaptive, systemic thinker, simply applied the same approach in each battle, thinking once he found the right terrain his operational approach would work. By contrast Alexander and his Macedonians could both withstand and produce more complexity than Darius and the Persians. Unlike Darius's forces, which only functioned under rigidly centralized command and control, Alexander could distribute his forces, conducting operations in a decentralized manner. He gave his subordinate commanders flexible orders and ensured they possessed a clear understanding of his intent and operational approach, entrusting them to exercise initiative based on this guidance.[19] Alexander not only employed a systemic approach in his destruction of the Persian Army; he also used his systemic approach to identify, attack, and destroy their COG. By defeating the Persian cavalry with his rapid maneuver at Gaugamela, Alexander presented a direct threat and unanticipated threat to Darius and his senior commanders, causing a rapid collapse of the Persian Army, and finally doing so in a manner that gave him the time to pursue and destroy the retreating army. Centuries later, another great captain – Napoléon Bonaparte – employed Alexander's concept of decentralized execution more effectively than any commander had yet done. One can see the effectiveness of Napoléon's fighting system exemplified in several campaigns, like his crushing defeat of the Prussian Army through the Jena-Auerstadt campaign of 1806.

[19]Delbrück, 198-199. The battle of Issus as described by Delbrück shows how Alexander and his army refused to cede the initiative to the Persian army, "Almost up to this very moment the balance actually stood almost even, inasmuch as the Persian cavalry of the right flank had just as great an advantage over its opponent – perhaps even a greater one... The reason is not to be found so much in the personal and tactical superiority of the Macedonians or in the stronger military spirit of Alexander the Soldier, as in the battle concepts of the two sides."

Jena-Auerstadt 1806

In 1806, Napoléon Bonaparte became the first operational artist in the history of modern war when he defeated the Prussian Army at Jena and Auerstadt. [20] Napoléon accomplished this by introducing a new level of complexity to military campaigning and battle not yet seen in the history of warfare. A century before the terms operational art, mission command, or systems thinking found their way into U.S. military doctrine, Napoléon's 1806 Campaign against the Prussians displayed several aspects of the modern application of these ideas, achieving a victory that sealed his position – for a time – as the undisputed military leader of Western Europe and remains a key part of his legacy as one of history's greatest military commanders. Napoléon possessed the ability to understand the strategic and operational environment; visualize the battlefield in both time and space; and describe his vision to his unit commanders in a manner that enabled him to direct his forces toward his desired end state in a distributed but highly effective manner. These characteristics set him apart during this period as a rare military genius and innovator; the military leaders of Europe's great powers fought him for a decade before they finally learned his methods and overthrew him. Today, military practitioners may recognize these as some of the principles of mission command.[21] However, the astute observer should recognize the underlying principles of systems thinking as well.

Napoléon possessed an unrivaled understanding of the battlefield during his time. His nuanced appreciation of the operational and strategic context of war enabled him to understand

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[20]Robert M. Epstein, *Napoleon's Last Victory and the Emergence of Modern War* (Lawrence: University Press Of Kansas, 1994), 6. Modern war, according to Epstein, contains the following characteristics: "a strategic war plan that effectively integrates the various theaters of operations; the fullest mobilization of the resources of the state, which includes the raising of conscript armies; and the use of operational campaigns by opposing sides to achieve strategic objectives in the various theaters of operations."

[21]Army Doctrine Reference Publication 6-0, *Mission Command* (Washington, DC: Government Printing Office, May 2012): 2-1.

the current operating environment and the need to design an end state that he and his commanders could achieve according to the French Army's ways and means in 1806. Before the 1806 campaign, a number of key events took place that Napoléon used to his advantage to shape his understanding of the pending war with Prussia. For example, the French Revolution, which occurred from approximately 1789 to 1799, played a major role in defining what France looked like militarily, economically, socially, and politically during Napoléon's reign, and set the ground work for his future as emperor and commander-in-chief of the French forces.[22]

Militarily, the revolution saw France establish its core doctrine in accordance with the *Ordinance of 1791* and institutionalized ideas such as the Gribeauval system for artillery, the addition of corps to the overall force structure of the French Army, and the use of a general staff for planning and disseminating orders. This latter factor, which facilitated Napoléon's success on the battlefield by capitalizing on his army's ability to execute decentralized operations, proved one of the main reasons Napoléon stood out as Europe's greatest captain for nearly fifteen years. The roots of the *Grand Armee's* ability to conduct decentralized operations grew directly from the soil of the French Revolution. Before the revolution, the *ancien regime* promoted officers primarily through a system based on social standing. Following the revolution, officers began to receive promotions based on merit, as measured by their performance and gallantry in battle; non-commissioned officers could even receive direct commissions, potentially rising to the rank of field marshal under this merit-based system. This in turn led to *élan*, or a sense of pride in execution across the entire French Army as its personnel recognized the potential to achieve promotion through superior battlefield performance. Napoléon recognized the potential of his men and promoted them accordingly. Moreover, the social phenomenon of *levee en masse* in

[22]David G. Chandler, "Napoleon, Operational Art, and the Jena Campaign," in *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington D.C.: Center of Military History, 2005), 28; Epstein, 13.

1793 resulted in a populace truly mobilized for war, meaning increased availability of troops for the military, increased factory output at home, and increased resources towards these military and political ends.[23]

Both militarily and politically France had recently completed a series of conflicts known as the Wars of the First, Second, and Third Coalition. This series of conflicts pitted France against most of the major European powers. Coming to power in the midst of this external turmoil and the internal strife of the French Revolution, Napoléon sought to reestablish France's military dominance in Europe. Politically, Napoléon sought the primary strategic objective of reestablishing what he and much of the French populace saw as France's original territorial boundaries. Of particular importance to the strategic context, the War of the Third Coalition resulted in France dictating peace terms to Austria, Prussia, and Russia. A relative latecomer to this war, Prussia especially received the brunt of Napoléon's ire during these negotiations. Seeing Prussia's last-minute entry into the war as a personal affront against France, Napoléon sought to provoke and punish Prussia through the peace settlement. He reduced Prussia's territorial boundaries by realigning some states within French borders, and forced the state to close its ports to Great Britain (a method that embraced Prussia within France's "continental system," which amounted to economic war with Great Britain by attempting to force the treaty's signatory nations to only trade with other continental powers). Part of the territorial restrictions involved swapping Hanover to Prussia. This led to the second provocation. After giving Hanover to Prussia, Napoléon then offered Hanover to Great Britain as part of their peace terms, seeking to draw Great Britain out of its secure position on its island nation and into a land war on the

[23]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 138-161; Epstein, 13-15, 17.

continent. In the end, Prussia instead militarily aligned itself with Russia in a coalition that declared war once again on France.[24]

Napoléon's vision for the 1806 Campaign involved forcing a decisive engagement with the Prussian main army commanded by the Duke of Brunswick, and defeating its forces before Russia could enter the conflict. Napoléon felt that a rapid defeat of Prussia before it could unite forces with Russia would enable him to achieve a rapid strategic military victory by sending Russia home without fighting, crippling Prussia so that it could not feasibly wage war with France again in the near future, and occupy Prussia as a buffer zone to the east of France against future Russian aggression. This logic led Napoléon to assess that the Prussian main army represented the COG of the nascent Prussian-Russian coalition, since defeating the Prussians in detail while Russia remained on the march gave him the best chance of accomplishing these objectives. For many of the same reasons that the Prussian Army represented the operational center of gravity, the Prussian government in Berlin emerged as the obvious strategic COGs for this campaign. Therefore, Napoléon put all efforts into locating and destroying Brunswick's Army before it could join forces with the Russian contingent.[25]

Napoléon designed his operational approach to accomplish this through one of two ways: either forcing the Prussian Army into a fight in the field before it intended to fight through outmaneuvering it, or by capturing Berlin and forcing the Prussian Army to return to Prussia and fight to retake its capital. In either approach, Napoléon saw this conflict ending in the defeat of

[24]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 444-451; Epstein, 15-29.

[25]David G. Chandler, "Napoleon, Operational Art, and the Jena Campaign," in *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington D.C.: Center of Military History, 2005), 39-40; David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 447, 464-465.

the Prussian Army before Russia could enter the war.[26] In typical Napoléonic fashion, he subdivided this campaign into three separate phases: movement to contact, the main battle, and exploitation or pursuit. Utilizing one major line of operation for the campaign, Napoléon divided his army into three operational columns that operated in a mutually supporting manner along their own subordinate lines of operation. By dividing his forces in this manner, Napoléon could take advantage of his army's ability to conduct decentralized operations at the corps level (formations designed to fight independently for up to a day as the rest of the army converged on the scene of battle and reinforced the main effort). Moreover, Napoléon operated in a distributed manner but generally along interior lines, which allowed him to increase his tempo, find and defeat individual enemy formations in detail before they joined forces, and minimize his lines of communication to external threats.[27]

Distributed maneuver also enabled Napoléon to employ his tactical concept of *la manoeuvre sur les derrieres* (essentially a form of indirect approach). In what historians have described as his favorite maneuver, Napoléon would learn that one of his corps had pinned his enemy with a frontal attack (either in a meeting engagement or, if intelligence enabled it, from a well-prepared attack position), and then issue orders for the remainder of his army to maneuver so that it outflanked the enemy force, attacking it from the flank or rear in a pincer movement. Thus, Napoléon envisioned a campaign that displayed self-similarity across scale, using distributed maneuver at the operational level to fight the Prussians before they could join forces with the Russians, and achieving a quick and decisive defeat of the Prussians by finding and enveloping their army through distributed tactical action executed by commanders using their initiative to

[26]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 464-467.

[27]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 162, 468; Martin Van Creveld, *Command in War* (Cambridge: Harvard University Press, 1985), 82-84.

operate within Napoléon's intent. Once joined in battle, French forces would envelope the Prussian Army, cut off its lines of communication, and then destroy it.[28] While Napoléon did accomplish this basic design at Jena, the engagement took place on a much smaller scale than he originally intended.

On October 14, as the day of battle dawned, intelligence reports convinced Napoléon that he faced with the bulk of his army the main Prussian force under Brunswick, near Jena. He would soon learn that he faced a mere detachment, with Brunswick's army actually located not at Jena, but Auerstadt, also believing that it faced the enemy main body. Instead, Brunswick also faced only a detachment – but a very powerful one; the French Third Corps under Marshall Davout.[29] Both battles ultimately ended in French victory, and the campaign offers several key insights to modern military practitioners.

The decentralized nature of Napoléon's army allowed Davout, the flexibility and initiative required to take immediate action at Auerstadt without losing time waiting for orders or reinforcements, enabled him to deploy quickly into battle formation and press the attack against the Prussians, including the king and queen, most of whom just began to deploy out of march formation on the road running through the battlefield as Davout's corps began its attack. Davout managed to defeat the numerically superior Prussian force at Auerstadt with relative ease, despite the mysterious absence of Bernadotte, the nearest corps commander whom Napoléon expected to support Davout (Bernadotte's exact whereabouts and activities on that day remain a mystery historians have never resolved).[30]

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[28]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 464;Creveld, 89.

[29]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 471-479; Creveld, 90-92.

[30]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 490-497.

Ironically, failures at Jena – Auerstadt highlight the overall strength of the Napoléonic system. Faulty intelligence and "the fog of war" led Napoléon to misunderstand force dispositions until he had lost the opportunity to maneuver corps where he needed them to both achieve evenly matched force ratios at each battlefield, and at Jena, to have enough reserves on hand to accomplish an effective pursuit and exploitation. Consequently, Napoléon won the 1806 Campaign, but did not fully realize his strategic objective. Had he correctly identified the forces that he faced or heeded his commanders in the field, he may have been able to take full advantage of the serious defeat that he dealt to the Prussians at both Jena and Auerstadt by pursuing the retreating remnants of the Prussian Army from the field at Auerstadt, where many of Prussia's best units, habitually co-located with the royal family on campaign, retreated in good order and survived to fight Napoleon in later campaigns.[31]

Napoléon communicated and directed this vision to his commanders using his general staff. Napoléon's leadership permeated all the way to the individual soldier. As commander-in-chief and Emperor, he had the opportunity to seamlessly blend the strategic and operational aspects of warfare to enable his military forces to achieve their maximum potential. Napoléon also normally made masterful use of information, despite the intelligence failures at Jena – Auerstadt, and he famously influenced events on the battlefield through use of deception and skillful maneuver enabled by intelligence gathering. He strongly relied on his cavalry as his primary tool to perform intelligence collection.[32]

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[31]David G. Chandler, "Napoleon, Operational Art, and the Jena Campaign," in *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington D.C.: Center of Military History, 2005), 63; Epstein, 31.

[32]David G. Chandler, "Napoleon, Operational Art, and the Jena Campaign," in *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington D.C.: Center of Military History, 2005), 28-32; Creveld, 65-78; Epstein, 24-25.

Napoléon's command style directly reflects what the modern practitioner finds in the current U.S. Army Field Manual 6-0, *Mission Command*, a concept defined as "the exercise of authority and direction by the commander using mission orders to enable disciplined initiative within the commander's intent to empower agile and adaptive leaders in the conduct of full spectrum operations."[33] By ensuring his commanders fully understood his intent and end state, Napoléon enabled his commanders a freedom on the battlefield not seen before. His commanders, fully understanding their emperor's desired end state, took the initiative to accomplish the mission as they saw fit, much like Marshall Davout did at Auerstadt. Other armies during this period did not execute decentralized operations. Units operated under strict command and control in a lock step fashion, rarely leaving the range of their commander-in-chief's direct physical control, exercised through orders passed by aides-de-camp.[34]

Napoléon employed a style of movement and maneuver that remained unique until the final years of his reign, when his opponents finally learned his methods and returned balance to the battlefield after a long period of French dominance. The corps system enabled Napoléon to modify his forces and move directly from deployment into battle. This structure provided Napoléon the opportunity to force battle on his opponents before they had time to prepare, as Davout did at Auerstadt.[35] The typical eighteenth century army marched to battle, conducted an operational pause, and then began fighting. Napoléon's system of movement to contact removed the necessity for an operational pause and enabled his units to maintain both unprecedented speed and tempo (the corps of the *Grande Armeé* could both move faster and fight longer than their

[33]U.S. Army, Field Manual 6-0, *Mission Command* (Washington, DC: Government Printing Office, September 2011), 1-2.

[34]Epstein, 22.

[35]David G. Chandler, "Napoleon, Operational Art, and the Jena Campaign," in *Historical Perspectives of the Operational Art*, ed. Michael D. Krause and R. Cody Phillips (Washington D.C.: Center of Military History, 2005), 33-34.

enemies because of the flexibility and mobility of their formations, their foraging techniques, and the self-sustainment abilities each corps possessed). Additionally, Napoléon's use of intelligence provided him with the clearest picture possible. Specifically, Napoléon made good use of human intelligence and spy networks leading up to and throughout this campaign.[36] However, as demonstrated at Jena-Auerstadt, Napoléon's hubris often affected outcomes. While some confusion existed in early reports, once Davout and Napoléon's other subordinate commanders had developed a clear understanding of the situation and reported it accurately, Napoléon refused to believe that he did not face the bulk of the Prussian Army at Jena until the day's battles had drawn to a close.[37]

As alluded to above, sustainment made up a major and unique element of Napoléon's combat power. The sheer size of a Napoléonic army made sustaining that army difficult. Nevertheless, by spreading his distributed subordinate formations out along separate but parallel lines of operation, not rejoining until necessary to engage in combat, Napoléon increased foraging opportunities that significantly lessened the requirement for traditional sustainment support and enabled him to fight much longer without any of his corps elements reaching offensive culmination. The French army maintained minimal and agile lines of communication with much smaller baggage trains than those still in use by other late eighteenth and early nineteenth century armies. Napoléon also recognized the hazards these novel methods entailed and took effective measures to minimize risk. Information management represented perhaps most important capability – and its interruption therefore the most sever risk – to any army that relied so heavily on distributed operations by relatively autonomous subordinate organizations. However, Napoléon established a plan to mitigate external risks like these by whatever means possible; for

[36]David G. Chandler, *The Campaigns of Napoleon* (New York: Macmillan Publishing Co., Inc., 1966), 146-148.

[37]Ibid, 478-479, 488.

example, a certain measure of risk existed in splitting his forces along such a wide swath of terrain during movement to an engagement. Napoléon mitigated this risk by prioritizing communications and support between units throughout the campaign, and by using terrain to his advantage in concealing his units where possible, especially during movement (an ability he possessed to an almost mythical degree, as indicated by the *coups d'oiel* for which he served as the example that Clausewitz used when writing about this aspect of military genius).[38]

This summary of Napoleon's 1806 Campaign has highlighted many important aspects of the campaign that demonstrate Napoléon's systems approach to operations. By analyzing the collective behaviors and patterns of the Prussians, Napoléon understood that most of their commanders were over-aged and lacked initiative. Additionally, the strategic source of power for Prussia resided in their seat of government, located in Berlin, and in King Wilhelm III, located with Brunswick's army. This constituted Prussia's COG, both strategically and operationally, and even though he misjudged the royal party's location until late during the day of the Jena and Auerstadt battles, his unique form of combat maneuver and command enabled Davout to quickly route the bulk of Prussia's army, including its most elite guard units and the king and queen themselves. Moreover, Napoléon's inherently decentralized methods introduced a level of complexity with which Prussia simply could not contend. As historian Martin Van Creveld has written, "Whereas Napoleon's opponents sought to maintain control and minimize uncertainty by keeping their forces closely concentrated, Napoleon chose the opposite way, reorganizing and decentralizing his army in such a way as to enable its parts to operate independently for a limited period of time and consequently tolerate a higher degree of uncertainty."[39]

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[38]Ibid., 467-468. *Coups d'oiel* refers to the ability to discern at one glance the tactical (dis)advantages of the terrain.

[39]Creveld, 101.

Napoléon certainly benefited from the positive outcomes of the French Revolution and the achievements of the military leaders that preceded him. However, he took control from this position of advantage and achieved far more than anyone could reasonably expect from a general of that era. His unique ability to combine these preexisting elements into a competitive and cooperative fighting force showed his true genius, and seems clearly to exhibit a systems view of warfare at the strategic, operational, and tactical levels. Each commander under Napoléon understood his purpose in the overall goal of destroying the Prussian Army. Given that broad understanding of their commander's intent, Napoléon's marshals could quickly adapt to change and turn surprise into opportunity – a highly desirable trait in a commander or a military force then as well as now.

Napoléon did, however, suffer from several key flaws – minor, perhaps, in 1806, but increasingly significant in the later years of his rule. The 1806 Jean-Auerstadt Campaign did not produce the strategic political end state that Napoléon set out to accomplish. Operationally, Napoléon's and Davout's combined efforts led to the defeat of the Prussian Army and the short-circuiting of the planned Prussian-Russian coalition effort against France. However, Davout lacked adequate forces at Auerstadt to exploit the Duke of Brunswick's defeat and destroy the bulk of the Prussian Army or capture the royal family. Nor was Napoléon able to seize Berlin before key leaders escaped the city. However, this does not change the fact that Napoléon's planning and execution of the 1806 campaign, and his design and leadership of the *Grand Armeé* in general, demonstrate his nature as a systemic thinker. He correctly identified both the operational and strategic COG, by recognizing the patterns established in the actions of the adversary's system. He recognized that defeating the Prussian main army would lead to a collapse of the system at the operational level, thereby weakening the greater system for future exploitation. Napoléon did not use the term COG, but its inventor – Carl von Clausewitz – drew his inspiration for much of his military theory, which introduced the term, from Napoleon's

campaigns. Regardless history shows that Napoléon understood and successfully used the COG concept during this campaign by organizing, planning for, and executing it using the benefit of his insights as a systems thinker.

The previous two case studies each occurred before the introduction of the COG into military vernacular. The following case study looks closely at the U.S. involvement in the Vietnam War, in particular, the Cambodian Campaign, to determine whether the U.S. forces involved employed a systemic approach during this campaign.

Vietnam War (The 1970 Cambodian Campaign)

The 1970 Cambodian campaign represents a significant and atypical series of combat operations that illustrates General Creighton W. Abrams' ability to identify a unique time in the Vietnam War. With Abrams, the U.S. Army had an individual astutely attuned to the situation and the interconnectedness of the region and actors – in short, an individual with the capacity to view the war from a systems perspective. This led him to understand the necessity of conducting this highly controversial campaign, and use his leadership ability to convince America's political leadership to both approve and publicly support it. Analysis of this campaign provides a useful example of identification of a COG from a systems perspective, and the conduct of a highly successful campaign based on that understanding.

To situate the Cambodian campaign within its origins and contemporary context, the scholar must first appreciate the larger context of the war in Vietnam. However, space constraints prevent a comprehensive study of U.S. involvement in Vietnam. Therefore, a contextual understanding of the immediately preceding events will set the stage for analysis of the Cambodian campaign itself. With this purpose in mind, the events of 1967 and beyond merit particular attention. From the beginning of significant U.S. involvement in Vietnam, President Lyndon B. Johnson, and then-U.S. commander in Vietnam General William C. Westmoreland relied on an operational approach to achieving America's aims by exhausting the North

Vietnamese Army (NVA) and the Viet Cong (VC) insurgency through attrition. In short, Westmoreland attempted to break the will of the North Vietnamese using overwhelming firepower and massing troops when possible to destroy any enemy formations U.S. forces could find during search and destroy missions. [40] However, after three years of conflict, the results achieved in Vietnam, or lack thereof, led to an increasing sense of disenchantment among the American people and top civilian and military leaders. Westmoreland's prediction that the U.S. military would achieve decisive results in 1967 made the lack of quantifiable success particularly difficult to stomach, both for America's military forces and for the American populace.[41]

The year 1968 marked a rather turbulent time in Vietnam. Shortly after the New Year, the NVA launched the 1968 Tet Offensive. The offensive led to an operational defeat for the NVA and Hanoi. The VC in southern South Vietnam bore the brunt of the failure as most of the VC leaders either died during the attack or fled to Cambodia.[42] Despite the NVA and VC suffering a significant military defeat, however, the Tet Offensive – largely because of its scale and the degree of surprise the enemy achieved – severely decreased the already waning morale of the U.S. population and served to increase the sense among all parties that America's war in Vietnam had turned into a quagmire. Consequently, Johnson relieved Westmoreland in 1968, replacing him with Abrams and decided not to run for re-election that year.[43]

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[40]John M. Shaw, *The Cambodian Campaign: The 1970 Offensive and America's Vietnam War* (Lawrence: University Press of Kansas, 2005), 1; Lewis Sorley, *A Better War: the Unexamined Victories and Final Tragedy of America's Last Years in Vietnam*, Reprint ed. (Orlando: Harvest, 1999), 1.

[41]Sorley, 5.

[42]Graham A. Cosmas, *MACV: The Joint Command in the Years of Withdrawal, 1968-1973* (Washington: Center of Military History, 2007), 59-61; Shaw, 10-11; Sorely, 12-15; Tran Dinh Tho, *The Cambodian Incursion* (Washington, DC: Center of Military History, 1980).

[43]Cosmas, 84, 102; Shaw, 2; Sorley, 4-7.

In 1969, President Richard Nixon and Abrams worked together to reach a new understanding of the situation in Vietnam. This led the U.S. military and Republic of Vietnam Armed Forces (RVNAF) to cease focusing simply on "not losing the war."[44] The allies shifted their focus in developing an operational approach to one based on a systemic approach, one designed to create space between the recently weakened NVA and the Government of Vietnam (GVN). The precepts of this plan involved attacking known sanctuaries – specifically lines of communication and supply – increasing partnership up and down the chain of command with RVNAF, and focusing on Vietnamization.[45] The new approach involved a greater attempt at unifying previously disparate efforts. As the historian Lewis Sorely points out, "Abrams also understood that the war was a complex of interrelated contests on several levels, and that dealing with the enemy effectively meant meeting and countering him on each of those levels."[46] Abrams identified the key to "ultimate victory" as increasing pacification and protecting the population of South Vietnam.[47] With this strategic COG in mind, Abrams identified the NVA's operational COG: its lines of communication (LOCs) and freedom of action inside neighboring, nominally neutral countries. By attacking the NVA's LOCs and freedom of action, Abrams could provide the time and space needed to meet Nixon's political end state of "Vietnamization."

This approach took on greater emphasis as Nixon began phased troop withdrawals in the summer of 1969. To mitigate the risk of these troop withdrawals, Nixon authorized for the first

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[44]Shaw, 7.

[45]Military historian Graham A. Cosmas described "Vietnamization" as the "unilateral withdrawal of American combat troops combined with a major effort to strengthen Saigon's armed forces." Cosmas, 143.

[46]Sorley, 18.

[47]Ibid., 169.

time, the bombing of NVA and VC logistics bases in Cambodia through Operation Menu. [48] This operation and the new allied approach in Vietnam produced tangible results. As Kissinger noted in the *White House Years*, Abrams, "credited the Menu operations with disrupting enemy logistics, aborting several enemy offensives, and reducing the enemy threat to the whole Saigon region."[49] This operation combined with the significant losses suffered during the 1968 Tet Offensive caused the NVA to rethink their current strategy and move towards a protracted war with the publication of Resolution 9.[50] The effect of these actions coupled with the March 1970 coup of Lon Nol in Cambodia led to a permissive environment that finally allowed the U.S. and RVNAF to take the fight to the enemy.[51]

Abrams's operational approach for the Cambodian campaign centered on three lines of effort designed to disrupt the enemy operational COG, specifically his logistics and known or suspected operating bases inside Cambodia.[52] The first line of effort required defeating the NVA currently arrayed along the Cambodian border. The planned operations associated with this line of effort consisted of the continuation of operation Menu air attacks, supplemented with ground offensives along three lines of operation: Toan Thang 42, 43, and 44. Toan Thang 42, a unilateral operation, consisted of RVNAF attacking two areas of key terrain – the "Parrot's Beak" and the

[48]Shaw, 14-15; Sorley, 117.

[49]Henry Kissinger, *White House Years* (Boston: Little, Brown and Company, 1979), 249.

[50]Shaw, 14-15; Sorley, 156.

[51]Cosmas, 293; Shaw, 25, 34; Sorley, 191.

[52]U.S. Army, Army Doctrine Reference Publication 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, May 2012), 4-5. The term "lines of effort" is a current U.S. Army term which doctrine defines as "a line that links multiple tasks using the logic of purpose rather than geographic reference to focus efforts toward establishing operational and strategic conditions." It is appropriate to use this term as it provides clarity and context familiar to the modern military professional.

"Angel's Wing."[53] Toan Thang 43, a combined operation executed by the Army of the Republic of Vietnam (ARVN) Airborne Division and the U.S. First Cavalry Division involved attacks against the NVA's Central Office for South Vietnam (COSVN) headquarters and another key area known as the "Fishhook."[54] In Toan Thang 44, ARVN units fought alongside the U.S. 25th Infantry Division.[55] Coalition forces intended during Toan Thang 44 to destroy the NVA's base area 354.[56]

The second line of effort, centered on what the U.S. Army now refers to as information operations, consisted of two key components.[57] First, coalition forces sought to control the flow of information both at the national level and among U.S. and South Vietnamese operational units.[58] As historian John M. Shaw has explained, "The White House, particularly Nixon and the National security council staff under Henry Kissinger, was taking no chances of leaks that would ignite domestic controversy and thereby preclude possible options."[59] Similarly, any details of U.S. plans leaked to the communists could imperil troops involved in the operations. The second

[53]Shaw, 55-56; Tho, 51-65. Toan Thang was the name chosen by the Vietnamese Joint General Staff, which meant "Total Victory." Additionally, the areas of the "Parrot's Beak" – aptly named because it jutted out like the beak of a parrot – and the "Angel's Wing" – named in reference to its appearance as a wing – referred to NVA sanctuaries just inside Cambodia, approximately fifty kilometers west of Saigon. U.S. and Vietnamese forces also referred to these sanctuaries as base areas 367 and 706 respectively.

[54]Tho, 70.

[55]Shaw, 56, 66, 105; Tho, 70-79.

[56]Shaw, 117; Tho, 78-79. Base area 354 referred to an NVA sanctuary just south of the expected COSVN Headquarters and north of both the "Parrot's Beak" and the "Angel's Wing."

[57]U.S. Army, Field Manual 1-02, *Operational Terms and Graphics* (Washington, DC: Government Printing Office, September 2004), 1-99. FM 1-02 defines information operations as "actions taken to affect adversary information and information systems while defending one's own information and information systems."

[58]Shaw, 32-33.

[59]Ibid., 33.

major component involved the use of military deception operations, specifically in pre-staging troops and equipment close enough to the border without forecasting the pending operations. To accomplish this, the II Field Forces Vietnam (IIFFV) commander and overall commander of the operations Toan Thang 43 and 44, Lieutenant General Michael S. Davison, limited the movement of troops and equipment to the border until after the initial attack. Davison simplified this process by using those units already located closest to the border during the initial stages of the operation.[60]

In the final line of effort, loosely defined as "capacity," U.S. forces sought to capitalize on the space created through the defeat of the VC in southern South Vietnam during the 1968 Tet Offensive, opening a window of opportunity for U.S. and RVNAF forces to act inside Cambodia, thereby increasing ARVN morale and the overall effectiveness of Vietnamization. For example, Lieutenant General Julian Ewell, the previous commander of IIFFV, established the "Dong Tien program," which paired American units with ARVN counterparts.[61] While certain Vietnamese units continued to show signs of poor morale and general ineffectiveness in combat, the overall impact of these operations positively affected the morale and readiness of the ARVN.[62]

Abrams and his commanders identified several key tasks within this campaign. Both U.S. and ARVN forces pre-positioned close enough to the border to allow quick movement once operations began. This was essential in maintaining the element of surprise and tempo throughout the operation.[63] Additionally, logistics remained decisive, both for friendly and enemy units.

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[60]Shaw, 59.

[61]Ibid., 50.

[62]Shaw, 44, 50, 52; Tho, highlights the importance of these operations, specifically TOAN THANG 42, "To operate without U.S. advisers was a source of pride for ARVN tactical commanders of battalion level and above. They felt more self-assured of their command abilities and, in fact, they all proved that they could manage by themselves."

[63]Shaw, 29, 59-60.

Abrams wanted to severely cripple the NVA by either taking or destroying its logistical stockpiles across the Cambodian border. For friendly units, logistics would play a pivotal role if the NVA offered strong resistance, especially in light of the aforementioned limitation in the number of units located close to the border before operations began. Abrams also identified several decisive points – primarily the many NVA base areas and headquarters along the Cambodian border. If Abrams could accomplish his key tasks and achieve the desired effects against these decisive points, he felt confident he could achieve operational success in providing additional time and space for "Vietnamization."[64]

Nixon, in his 29 April 1970 public address, described the limited scope of this campaign.[65] U.S. forces would remain relatively close to the Cambodian border and would leave Cambodia by 30 June 1970. This limited Abrams' ability to test the potential operational reach of the campaign – it remains an open question how much more coalition forces could have accomplished if given greater freedom of action. Similarly, had the U.S. and ARVN forces faced strong resistance during the initial stages of the campaign, logistics would have played a significant role in limiting how quickly and how far the coalition forces were able to extend.

The Cambodian campaign consisted of four main phases, with some taking place sequentially and occurring simultaneously. Phase I consisted of intelligence gathering and other preparations for the campaign. For U.S. forces, this phase began in early January 1970, long before execution, when Abrams began contingency planning in the hopes for an invasion of Cambodia.[66] Phase I ended in early May when the combined U.S. and ARVN forces began the offensive into Cambodia. Phase II consisted of the sequencing of attacks between U.S. and

[64]Ibid., 32.

[65]Cosmas, 298; Shaw, 100.

[66]Shaw, 29.

RVNAF forces. This phase began on 30 April 1970 with Operation Toan Thang 42 and ended between 05 and 06 May 1970. Phase III consisted of multiple exploitations to further degrade the NVA. This phase began on 05 May 1970 and lasted until the completion of the Cambodian campaign, which ended on 30 June 1970. [67] Phase IV consisted of the withdrawal of U.S. troops from Cambodia to Vietnam.

This operation involved several inherent risks – particularly operational security. This entailed both political and tactical risk, in that if word leaked about the operation either in the United States or in North Vietnam, the resulting inability to capitalize on the element of surprise would seriously undermine any future successes if not lead to cancellation of the operation entirely.[68] Weather represented the second major risk since the primary monsoon season for the region typically began in either April or May. An early monsoon season would have severely hampered logistics and movement. Moreover, because of the secrecy of the operation, Abrams would not authorize movement of additional supplies forward before the operation began. Units relied upon on-hand stocks until after the initial attacks. As a solution once operations began, Abrams directed his logisticians to establish a "push" system of supply – unlike the standard system in which units sent trains back to resupply units for stocks, in the "push" system logistics units moved priority items forward in an anticipatory fashion based on predicted demand.[69] The campaign also had to account for the risk that NVA forces would attack in mass across the I Corps Tactical Zone in the northern region of South Vietnam, near the demilitarized zone, which

[67]Shaw, 102; Tho, 79. The U.S. First Cavalry Division began the first of a series of exploitation attacks that had been previously unplanned. These attacks targeted additional NVA base areas and caches.

[68]Shaw, 33,

[69]Ibid., 66, 68, 98.

could result in outflanking or enveloping coalition units conducting the offensive.[70] To mitigate this, Abrams opted to use what he believed to be the minimum number of units necessary.

While those around him found Abrams abrasive at times, he possessed the rare ability to direct his forces through effective leadership and command and control in a way that facilitated their adaptation to a complex environment. During Westmoreland's time as the commander, coalition forces singularly focused on the destruction of enemy forces inside Vietnam. Abrams, however, understood the interconnectedness of the region as expressed in his "one war" concept.[71] He clearly articulated his commander's intent and empowered his subordinate leaders to execute as necessary. This does not imply that he simply let them loose. He maintained contact with his subordinates throughout the entirety of the operation, but resisted the temptation to micromanage them.[72]

U.S. and ARVN forces conducted the campaign by integrating ground assaults and helicopter insertions. Coordinating and synchronizing these movements entailed establishing joint command and control cells at the tactical level. Coordinating artillery fires presented a particularly challenging obstacle to combined operations between the allies. While the ARVN infantry by this point in the war performed nearly as well as its American counterparts, ARVN artillery coordination remained sporadic and unreliable. To account for this, units established integrated fire and effect cells to monitor and control fires from both U.S. and ARVN artillery

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[70]Shaw, 32.

[71]Ibid., 25. Shaw explains how the North Vietnamese viewed the system, "Hanoi did not consider its actions in Cambodia wrong or illegal, since to the Politburo the fighting in Indochina was part of a larger, interrelated struggle"; Sorely, 18. Sorely explains Abrams's "one war" concept and "the false dichotomy that has grown up in discussing the war, with contending view-points arguing that it was a guerrilla war on one hand or a conventional war on the other. The fact is that it was both... The 'one war' approach recognized and accommodated this pervasive though shifting reality."

[72]Ibid., 59.

units.[73] Additionally, both air and naval assets assisted in the operation. Both proved extremely effective in supporting operations through various means, including friendly resupply and interdiction of enemy troops.[74] A key asset to the success of the operation, intelligence provided invaluable insight regarding the location and disposition of enemy sanctuaries located in Cambodia. Abrams had a number of intelligence assets at his disposal, to include "human sources and reconnaissance, electronic means, and aerial over flights and photography."[75]

Because of the systemic approach that Abrams and his team took, the operation achieved great success while overcoming numerous obstacles. Abrams had the benefit of serving as Westmoreland's assistant for a number of years before taking command. During this time, he was able to see the patterns that developed; in particular, he understood the nature and significance of the NVA's use of the Ho Chi Minh trail and Sihanoukville for resupply; the use of interstate boundaries as protection for sanctuaries in "neutral" countries; and, the need to secure the local population in the villages.[76] By recognizing these patterns, Abrams correctly identified the pacification of the populace as the strategic COG. Additionally, he deduced and attacked the weakest of the links that bound the populace to North Vietnam – the NVAs lines of communications and logistics. No commander could accomplish this without understanding how the system worked. Unlike his predecessor, Abrams understood the complex interconnections between each of the parts of the system in which he operated. He understood that the NVA saw the problem not as North Vietnam versus South Vietnam, but a fight for all of Indochina. Because

[73]Ibid., 73.

[74]Ibid., 140-145.

[75]Ibid., 19, 36-37. While the intelligence picture at MACV seemed more than adequate, there was a disparity between what Abrams saw and what other agencies, specifically the CIA, saw.

[76]Ibid., 163.

of the cohesiveness of the team that Abrams built, it adapted quickly to the changing situation. One can see this most clearly in the quick turnaround from initial planning at the corps level to execution at the division level. Further, the changes Abrams enacted improved the divisions' ability to exploit the tactical situation quickly as intelligence matured throughout the operation.[77] Additionally, Abrams provided his commanders with a clear purpose and end state supported by actionable intelligence. The Cambodian campaign successfully employed a systemic approach to understanding and attacking an adversarial system.

Following this period, the U.S. Army underwent massive changes. Americans – both civilian and military – vowed never again to conduct a war like the one they experienced in Vietnam. Two key events that took place in 1973 illustrate the coming sea-change: the institution of an American all-volunteer force, and the effect of the 1973 Arab-Israeli war on U.S. organization, equipment, doctrine, and predictions about the nature of future wars. Within this changing context, the U.S. Army introduced the COG into its new, more conventional-war focused doctrine, which it eventually "validated" during Operation Desert Storm.

Operation Desert Storm

During the two decades prior to Operation Desert Storm, the U.S. Army experienced a renaissance in doctrine, training, and technology. The U.S. Army, determined not to fight another war like the one it experienced in Vietnam (arguably a military success but a strategic defeat) began this reframing in 1973 with the creation of the U.S. Army Training and Doctrine Command (TRADOC) under General William E. DePuy, a highly respected officer and veteran of World War II.[78] DePuy, in his fourth decade of military service, drew on a number of significant

[77]Ibid., 59. Abrams tasked Davison initially on 24 April.

[78]Richard M. Swain, "Filling the Void: The Operational Art and the U.S. Army." In *Operational Art: Developments in the Theory of War*, ed. by B.J.C. McKercher and Michael Hennessy (Westport, CT: Praeger, 1996), 147-148.

experiences and basic principles to shape his thinking in this new position. These included a deep respect of German tactics during World War II – perhaps exaggerated by his service in one of the least successful American divisions of the war – a desire both to avoid another war like the one in Vietnam and to help the U.S. Army put the memory of that war to rest, and the profound effect of the 1973 Arab-Israeli War that, at least to DePuy, represented both the future of warfare and the model to guide the U.S. Army's post-Vietnam recovery.[79] Under DePuy's guidance and that of his successors at TRADOC, U.S. Army doctrine evolved quickly, from DePuy's "active defense" concept published in the 1976 version of Field Manual 100-5, *Operations*, to the more widely accepted "Airland Battle" concept published in the 1986 manual.[80] During this period of self-reflection and change, the U.S. Army identified the need to include in its doctrine and practice both the operational level of war and operational art.[81] Additionally, implementation of the new doctrine brought with it new equipment, training methods, and permanent training centers. The Army also devoted a great deal of effort reforming its education system leading, among other reforms, to the creation of the School of Advanced Military Studies (SAMS).[82] A three-year program consisting of one year at the Command and General Staff College, a second year at SAMS, and a third year in a utilization assignment as a division or corps-level plans officer, SAMS sought to educate officers in "operational art, higher-level command and staff coordination and historical precedents."[83] All of these factors – new doctrine, improved training,

[79]Ibid., 150.

[80]Ibid., 153.

[81]Swain, 160; U.S. Army, Field Manual 100-5, *Operations* (Washington, DC: Government Printing Office, 20 August 1982), 2-3; U.S. Army, Field Manual 100-5, *Operations* (Washington, DC: Government Printing Office, 05 May 1986), 10.

[82]Swain, 160-161.

[83]John S. Brown, "The Maturation of Operational Art: Operations DESERT SHIELD and DESERT STORM." In *Historical Perspectives of the Operational Art*, ed. by Michael D. Krause

reemphasis of professional military education, and the creation of SAMS – led to the intellectual renaissance that DePuy originally envisioned when he took command of TRADOC.

This renaissance involved a physical as well as an intellectual evolution; the U.S. Army had to both understand operational art and institutionalize training at the operational level. It did so through innovations like computer simulations, the advent of the Battle Command Training Program, and use of training areas like the National Training Center, finally developing the capability to rehearsing full-scale exercises at the operational level. Additional technological advances in vehicles, communications, and logistical assets enabled the U.S. Army to turn what once was a corps fight into a division fight, and to self-sustain with the "Capable Corps."[84]

Before the invasion of Kuwait, Iraq honed its military in a number of ways. Since the late 1950's Iraq had received military aid – in the form of both training and equipment – from the Soviet Union. Throughout the Cold War Iraq also mobilized its armed forces during a number of conflicts, including the 1967 and 1973 Arab-Israeli wars and multiple, ongoing conflicts with Iran. The eight-year Iran-Iraq war enabled Iraq's leader, Saddam Hussein, to transform his personal bodyguard into an extremely capable fighting force known as the Republican Guard. Consequently, the Iraqi Army began to show signs of improvements in combined arms maneuver, culminating in 1988 with Iraq's seizure of the Iranian-held Al Faw Peninsula in a thirty-five hour-long operation.[85] One can see the beginning of the Republican Guard's ascendancy in the Iraqi Army during this conflict. While it gained invaluable military experience during the war with Iran, at the end of the conflict Iraq had not achieved its strategic aims and found itself in serious financial trouble. Saddam blamed Kuwait for these troubles, claiming, "that it [Kuwait] was

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and R. Cody Phillips, 439-481. (Washington D.C.: Center of Military History, 2005), 440-441.

[84]Brown, 442-444.

[85]Stephen A. Bourque, *Jayhawk: the VII Corps in the Persian Gulf War* (Washington, D.C.: Center of Military, 2003), 19-21.

fighting Iraq economically," thereby setting the stage for a future invasion of the country.[86] The threat of invasion offered the additional benefit of indirectly applying pressure on Saudi Arabia, given the royal family's concerns about the security of the oilfields in the northern part of the country. On 2 August 1990, Saddam carried out his long threatened invasion of Kuwait with three Republican Guard heavy divisions in the lead, followed by additional motorized Republican Guard divisions.[87]

The United States found itself facing the challenge of forming and leading an international coalition while quickly building combat power in the Middle East before Iraq could consolidate its gains and possibly continue offensive operations by attacking Saudi Arabia. Once the coalition had formed and arrayed its forces, its leaders then had to develop a plan that would lead to the defeat of the Iraqi army and the liberation of Kuwait while minimizing casualties to the U.S.-led coalition. Subsequent problems would arise along the way; in particular, how to keep the Arab coalition intact despite friction over the possibility of an Israeli military response to any Iraqi aggression. As luck would have it, the United States had recently developed a scenario that addressed this issue. As historian John S. Brown wrote, "Central Command's (CENTCOM's) General Schwarzkopf had directed that the simulations-driven exercise Internal Look 90 depart from a Soviet threat and instead examine an attack of six Iraqi heavy divisions through Kuwait into Saudi Arabia."[88]

With Internal Look 90 as the starting point, Schwarzkopf began to develop an operational approach. Schwarzkopf and his planners identified the military end state as the continued defense of Saudi Arabia and the removal of the Iraqi Army from Kuwaiti territory while minimizing

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[86]Public Broadcasting Service, "Interview of Wafic Al Samarrai" for *Frontline: the Gulf War*, January 9, 1996, http://www.pbs.org/wgbh/pages/frontline/gulf/ (accessed March 19, 2013).

[87]Brown, 444-445

[88]Ibid., 444-445.

coalition casualties.[89] The termination criteria, however, remained in flux throughout planning and execution of the operation. During the planning process, Schwarzkopf identified two COGs, the Iraqi Republican Guard at the operational level and Saddam and the Baathist regime at the strategic level.[90] Schwarzkopf and his planners discerned the COGs by analyzing the patterns developed by Saddam and the Iraqi Army over the previous decade. The Republican Guard had played the decisive role in each of Iraq's most recent battles, Al Faw Peninsula in 1988 and Kuwait in 1990. At the strategic level, Saddam's ability to control the Republican Guard enabled him to control and suppress the people of Iraq.

To achieve the desired effects against these COGs, Schwarzkopf and his staff identified three key tasks. First, they planned to minimize coalition casualties by achieving an attrition rate of 50% of Iraqi ground forces through a combined air campaign before commencement of the ground force invasion.[91] Second, the coalition forces conducted a series of maritime and ground shaping operations. The first key task, a military deception operation, consisted of a demonstration with Naval and Marine assets in the Persian Gulf, which drew additional Iraqi reinforcements away from the main effort without decisively committing friendly forces. The second key task involved a shaping operation consisting of a ground force feint along the most likely avenue of approach towards Kuwait, the Wadi al Batin. Both of these operations accomplished the important goal of drawing enemy forces away from the coalition's decisive operation, the VII Corps, which served as the main effort during the ground attack into Iraq. The third key task, which would take place as part of the primary land campaign, consisted of

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[89]Ibid., 459.

[90]COL Joseph H. Purvis Jr. et al., "Interview: CENTCOM Planning Cell," in *Unedited Transcript*, ed. Richard Swain and Larry G. Heysteck (Riyadh, Saudi Arabia: CMH, Desert Storm Interviews, 1991), 33.

[91]Purvis, et al., 17.

isolating the Republican Guard from its logistical and command and control (C2) nodes located further north in Iraq. Coalition forces planned to accomplish this by conducting three supporting attacks. The I Marine Expeditionary Forces and the Arab coalition would independently attack north to seize Kuwait City, while the XVIII Airborne Corps would support their frontal assault with an envelopment to the northeast intended to cut off the Republican Guard from potential lines of retreat, thereby completing its isolation.[92]

Schwarzkopf established a campaign plan that consisted of the traditional six phases depicted in Joint Publication 5-0, *Joint Operational Planning*.[93] The decisive operation, Phase III, as military historian John S. Brown pointed out, "fell into the classic three-phase battle advocated as early as by World War I's Sir Douglas Haig: preparatory attrition, decisive attack, and exploitation."[94] The coalition accomplished this by fighting along four lines of operation. The air superiority line of operation targeted Iraqi forces in the open and degraded C2 capabilities. The deception line of operation paralyzed Iraqi forces and threatened a direct attack towards Kuwait, both on the ground and via the Persian Gulf. The ground line of operation isolated and defeated the Republican Guard and remaining Iraqi forces. Lastly, the sustainment line of operation integrated and supported all the moving pieces of a complex, well-rehearsed mission.[95]

Tied directly to the lines of operation, planners believed that coalition forces possessed adequate operational reach to conduct the campaign, particularly since the associated operations would all take place within the relatively small Kuwaiti Theater of Operations. Only the XVIII

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[92]Bourque, 31, 189; Brown, 459-463.

[93]Joint Publication 5-0, III-39 graphically depicts the standard five phase model: Phase 0, Shape; Phase I, Deter; Phase II, Seize Initiative; Phase III, Dominate; Phase IV, Stabilize; and, Phase V, Enable Civil Authority.

[94]Brown, 465.

[95]Ibid., 448-449.

Airborne Corps' mission to conduct an envelopment of the main body of the Iraqi Army – an operation involving a lengthy movement by ground and rotary wing air assets – and to then prepare for a possible attack towards Baghdad if necessary to pressure Saddam posed any significant risk to coalition forces' operational reach.[96] Had Schwarzkopf received guidance to continue operations north to seize Baghdad, operational reach might have played a significant role in what U.S. forces could accomplish.

The tempo of the operation, however, concerned Schwarzkopf and his planners. Generally, a U.S. armored division in 1991 could achieve a sustained rate of march of twelve miles an hour, while the light forces could achieve a rate of three miles an hour. Maintaining this tempo for more than a few days, however, required a detailed and synchronized logistics and sustainment plan. As the armored divisions moved forward they would rely on M977 and M978 Heavy Expanded Mobility Tactical Trucks (HEMTTs) and High Mobility Multipurpose Wheeled Vehicles (HMMWVs) to keep pace with much needed fuel, ammunition, and supplies. Further to the rear, 5,000-gallon fuel tankers and higher levels of maintenance support would struggle to keep pace near the rear of one of history's densest logistical tails supporting modern maneuver warfare.[97] In short, logistic sustainment capability created an upper limit to the operation's tempo. Ultimately this would influence when and where coalition forces would culminate. As Brown argued, "The operational result of this overly stretched fuel tether was that the allied advance had reached something of a culminating point by the hundredth hour of the ground war."[98]

Strategic risk existed in a number of areas. First, if the Allied forces did not move fast enough, Iraq could consolidate its gains and possibly invade Saudi Arabia. Even if Iraq did not

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[96]Purvis, et al., 59-64.

[97]Brown, 456, 468.

[98]Ibid., 469.

invade Saudi Arabia, it would exercise greater influence in the region as long as it remained in Kuwait or posed a military threat to its neighbors, causing turmoil throughout the world as oil prices would surely rise. Additionally, once Iraq began bombing Israel, the possibility of Israeli retaliation threatened to break apart the fragile Arab coalition. Planners mitigated these risks by developing an operational timeline in which units would deploy, train, and equip themselves as quickly as possible before deployment. Additionally, the coalition allocated additional resources to interdict any Scuds headed toward Israel. Operationally, risk existed in attacking an enemy that had spent months preparing a strong defensive position, and doing so with a less than favorable combat ratio and a heavy reliance on logistics to maintain tempo. Planners mitigated these risks planning the execution of the air campaign prior to beginning the ground attack, synchronizing these operations with a well-designed deception plan, and integrating logistics down through each of the corps.

Overall, the allied forces benefited from solid leadership. However, areas of tension did exist. For example, General H. Norman Schwarzkopf, the overall commander, wrote after the war that, "Franks' plan was simply 'too deliberate and lacked flexibility.'"[99] Additionally, Lieutenant General John J. Yeosock, originally the Third Army commander, fell sick just before the ground campaign. Following Yeosock's departure, Lieutenant General Calvin A. H. Waller temporarily assumed command in his place until his return a few days later. The significance of this change revolved around the two individuals' differing command styles. Where Yeosock believed in less micromanaging due to the inflexibility of large units, Waller believed in commanding in battle with more control over operations – control that the nature of modern warfare at the scale of

[99]Bourque, 38; H. Norman Schwarzkopf, Jr., and Peter Petre, *It Doesn't Take a Hero* (New York: Bantam Books, 1992), 503.

Operation Desert Storm made difficult to achieve in a hierarchical manner.[100] Despite the change in leadership, the overall plan remained unchanged.

The scheme of maneuver for this operation, while more detailed than earlier historical examples of such operations, provides a modern example of the Napoléonic indirect approach. The U.S. forces used an intense aerial bombardment to soften hard targets and degrade enemy C2 structures. Once the aerial campaign achieved its desired effects, a series of maritime and ground operations, designed to deceive the enemy into thinking Allied forces were conducting a direct attack into Kuwait, commenced. These two actions, coupled with the Allied force arrayal along the Saudi-Iraqi border, led the Iraqi Army to the logical conclusion that coalition forces planned to attack from the south, when in fact the decisive operation would attack north, past the Iraqi defenses, and then turn south, effectively cutting off the enemy's line of communications and retreat.

Coordinated fires, sustainment, and intelligence throughout the operation enabled Allied forces to sustain a tempo previously unheard of during modern combined arms maneuver. For example, Global Positioning Systems (GPSs) enabled commanders to track unit locations in near real time. They could now coordinate the movements of an entire "corps through hundreds of kilometers of trackless desert in the dark."[101] GPS had the additional benefit of decreasing the possibility of fratricide for both direct and indirect weapons systems by reducing the number of unknown friendly unit locations. As for intelligence, Brown claimed that because of the Allies' technological advantages, "No other has had as precise and accurate a picture of how its adversary laid out on the ground as did the American Third Army on 24 February, 1991."[102]

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[100]Bourque, 186-189.

[101]Brown, 456.

[102]Ibid., 454.

Operation Desert Storm stands out as an anomaly because it remains one of history's few examples of a plan executed as designed.[103] Schwarzkopf and his operational planners took a systemic approach to defeating the Republican Guard, removing Iraqi forces from Kuwait, and securing regional interests in the Middle East. The Republican Guard clearly served as the enemy operational COG through its decisive actions both in the previous war with Iran and during the invasion of Kuwait. As the planners analyzed both the macro level actions of Saddam and the micro level actions of the Iraqi Army, they developed an understanding that led to the emergence of the operational COG. The planners and commanders identified the intersecting collection of interdependent system components that all linked to the Republican Guard, and adopted a plan designed to address this COG as effectively as possible by isolating it from the rest of the system at the micro level through the XVIII Airborne Corps envelopment. However, one aspect of the plan did not occur exactly as planned involved the very element that served as the COG throughout the development of the plan. Despite executing the plan almost exactly as designed, coalition forces did not achieve the complete destruction of the Republican Guard. Because of miscommunications between Schwarzkopf and his commanders on the ground, the 28 February cease-fire ended any hopes of blocking the retreat of the remaining Iraqi forces.[104]

As previously mentioned, the U.S. Army sought to evolve into a more complex, well-functioning system, following the Vietnam War. Mired in tactical successes and strategic defeat, the Army incorporated operational art and the operational level of war into its doctrine and way

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[103]Stephen Biddle, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton, NJ: Princeton University Press, 2006), 3, 146-147. Military historian Stephen Biddle provides a cogent explanation of how and why the United States succeeded so dramatically in Desert Storm using the "modern system." According to Biddle, "The modern system is a tightly interrelated complex of cover, concealment, dispersion, suppression, small-unit independent maneuver, and combined arms at the tactical level, and depth, reserves, and differential concentration at the operational level of war."

[104]Bourque, 396-397.

of thinking. In its next major combat operation, Desert Storm, the U.S. Army and the coalition it led adopted a plan that successfully isolated the adversarial system's operational COG and caused a level of change that ultimately led to system collapse. The advent of new technology, computer simulations, GPS, increased mobility, etc., allowed a greater level of complexity than Iraq could handle. However, flaws did exist in the coalition's execution of Operation Desert Storm. Part of the Republican Guard escaped. Saddam's regime remained in power (indicating, perhaps, an overemphasis of the operational COG over the strategic COG, both of which a joint operational plan must take into account). Incidents of fratricide remained an issue despite GPS and other modern technology. All of these flaws and more remained areas that the U.S. military would have to address later. Nevertheless, at a minimum Operation Desert Storm provides another example of the benefit to the planner seeking to identify and exploit an enemy COG by using a systems approach.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In the four case studies presented above, one can see that each commander – wittingly or unwittingly – took a systemic approach in identifying and attacking his adversary's COG. Regardless of when the COG became a common military term, these historical examples demonstrate the advantage enjoyed by commanders who have employed systems thinking to determine an adversary's strengths and weaknesses. As proven in this analysis, the most effective way to employ the COG concept involves a systemic approach – identifying the number and nature of interconnections in the enemy system and using the resulting understanding to identify the part of the system both particularly interconnected and likely to achieve a system-wide effect if attacked. In the cases of Alexander and Napoleon, the commander did not have the benefit of reading and studying Clausewitz's teachings. Based on the longstanding debate over the true meaning of Clausewitz' ideas, perhaps this worked to their benefit. However, all four

commanders identified the patterns of collective behavior displayed by their adversaries. These patterns emerged through the interactions between the opposing systems. Moreover, because of their heightened situational awareness, these commanders accurately positioned themselves to take advantage of the situation by introducing a new level of complexity that caused each opposing system to collapse.

In the case of Alexander, after the crushing defeat of the Persian cavalry at Gaugamela, Darius had only two options: turn and flee or face annihilation. In each of three battles Darius fled leading rapidly to the collapse of his army and tactical victory for Alexander. After three such victories Darius could no longer amass an army and take the field against Alexander, who won the campaign against Persia. Meanwhile Darius fell into disgrace and died, leading to the eventual dissolution of the Persian Empire. In Napoleon's case, because of lapses in intelligence and tactics, he did not deliver the decisive blow to Prussia that he sought during the 1806 campaign. The superiority of his tactical system enabled him to defeat the Prussian army at Jena and Auerstadt. However, he lacked the ability to exploit his battlefield success as originally intended. This led to the escape of many Prussian Army formations from the field, as well as several key leaders from Berlin. Consequently, because he did not defeat his adversary's strategic COG, he fought many of these same formations again in future battles.

In the two later cases of Abrams and Schwarzkopf, each commander had the benefit of being able to study Clausewitz. This does not imply that each commander did in fact study the COG concept, only that military thinkers had studied the concept prior to the time of their campaigns. In Abrams' case, he may not have understood the COG concept in the sense that Clausewitz meant it, but he exhibited an understanding of complexity and the interconnectedness of the entire region that influenced his theater of war. By denying the NVA the ability to move men, weapons, and equipment freely in "neutral" countries, he disrupted the system long enough to accomplish his stated objectives. For Schwarzkopf, the combination of tactical, technical, and

numerical superiority combined with operational art enabled him to deliver a decisive blow to Saddam and the Republican Guard. However, fog, friction, and chance intervened against Schwarzkopf at the last minute, leading to the escape of part of the Iraqi forces. Much like Napoleon after 1806, one can argue that the United States paid for not completing the destruction of the Iraqi operational COG in later years.

Each commander correctly identified their adversary's COG because they were attuned to the strengths, weaknesses, and interconnectedness of the enemy's system. This enabled these commanders to lead their staffs in the design of campaigns that accounted for their enemies' strengths and weaknesses by understanding, visualizing, describing, directing, leading, and assessing the situation from a systems perspective. No one method or process enabled this common achievement in four campaigns that stretch across time and space – they only had in common systemic thinking.

Implications and Recommendations

The COG concept remains a relevant and useful tool for operational planners. Regardless of what the current literature says, commanders and planners benefit from a thorough analysis of both the adversary and the friendly COG. While reductionist in concept, COG-CV analysis serves as a useful technique to perform this analysis. However, when conducted using a systemic approach, its benefits increase exponentially. To apply a systemic approach to understanding the COG properly, the planner must reach beyond doctrine, which currently does not contain the necessary tools to prepare the planner adequately for systems thinking. Therein lays the tragic beauty of doctrine. At a glance, doctrine represents the source of all answers for those planning and conducting military operations. However, doctrine does not, nor should it, serve this purpose. Doctrine has always served as a tool one could use most effectively when combined with a deep understanding of the problem at hand, including its current and historical context and the other factors that make it unique. However, modern military doctrine would unquestionably improve if

written with complexity and systems thinking clearly articulated as foundational concepts, in clear language and relevance one can easily discern. Pending a long-overdue updating of doctrine to incorporate the fundamentals of systemic thinking, Army and Joint doctrine writers could achieve much by simply adding footnotes or a bibliography to the capstone documents wherever the current manuals mention systems, networks, effects, and other complexity or systems thinking-related concepts. By providing a reference to the source of these ideas, doctrine would enable the reader to conduct self-study, developing a deeper understanding of systems thinking and learning to employ these ideas more effectively.

For example, U.S. Army doctrine advises that when applying operational art, the commander and his staff should seek to understand both the enemy and friendly COGs. "The center of gravity is a vital analytical tool for planning operations. It provides a focal point, identifying sources of strength and weakness."[105] However, if the reader does not understand how history, theory, and doctrine relate, the COG can seem to offer nothing more than a simple targeting methodology. On the other hand, if the reader understands Clausewitz's COG as he meant it – as a non-linear concept, written along the lines of Kantian logic and focused on interconnectedness and probabilistic analysis – the possibility exists that an ever-expanding number of military practitioners will understand the true utility of the COG and COG-CV analysis, rather than simply continuing a pointless debate about methods and processes.[106]

Professional military education (PME) and doctrine are the main areas where the Army can improve understanding of COG analysis and systems thinking. It is not enough for military personnel or their instructors to simply read doctrine. They must understand the meaning behind

[105]ADRP 3-0, 4-4.

[106]Mark T. Calhoun, "Clausewitz and Jomini: Contrasting Intellectual Frameworks in Military Theory," *Army History*, No. 80 (Summer 2011): 32; Antulio J. Echevarria, *Clausewitz and Contemporary War*, (Oxford [England]: Oxford University Press, 2007), 25, 49.

the words. To do this requires further individual education on the reader's and the instructor's part. The Army must enhance understanding of systems thinking – often misunderstood as a "new science" or overly complicated and purely academic exercise – by integrating it into the established PME system. Because PME plays a critical role in the development of the Army's future leaders, it should provide an education that forces students out of their traditional comfort zones. It is not enough to say that doctrine uses a systemic approach, and support this assertion with a few network diagrams and buzzwords. Until doctrine and the PME embrace systems thinking, the U.S. Army will probably continue to debate the meaning and application of the COG to no effect, while certain key individuals will suffer on in silence, seeing the potential of the concept but lacking any means to spread that knowledge among the force.

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