

Strategy Research Project

On Theory of War and Warfare

by

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United States Army War College
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USAWC STRATEGY RESEARCH PROJECT

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Abstract

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Theory examining the purpose and motivations of war weds itself to human nature and obtains a degree of immutability. However, theory regarding the conduct of war, namely warfare, can more easily conflict with the changes brought by science and technology. Clausewitz provides a prophetic and lasting theory describing the tendencies and motivations that lead to war and limit its political aims, but his theory for the conduct of war has proven less enduring. His Napoleonic-era prescriptions maintained a powerful hold on the theory of warfare for nearly a century, but disruptive technologies, such as the gift of flight, eventually forced a reevaluation of theory and led to a rediscovery of sixth-century B.C theory attributed to Sun Tzu. Modern theorists like Julian Corbett, John Boyd, John Warden, and Shimon Naveh extended Sun Tzu's concepts, perhaps unwittingly, and his theory continues to resonate within the twenty-first-century American theory of warfare. These theorists proved Sun Tzu remains relevant to the perpetually changing realm of warfare, while Clausewitz's theory on war remains quintessential to the analysis and understanding of the purpose and motivations of war.

On Theory of War and Warfare

The real voyage of discovery consists, not in seeking new landscapes, but in having new eyes.

—Marcel Proust¹

One purpose of theory is to expose logical explanations of observed patterns to constructive discourse, allowing theory to evolve over time.² However, to the extent that theorists examine the purpose and motivations of *war*, their theories seem wed to human nature and obtain a corresponding degree of immutability, while theories addressing *warfare*, the conduct of war, more easily conflict with the realities brought by inevitable advances in technology. Far from suggesting that theories on warfare are not useful, this only implies they cannot be as enduring as theories on war – they should be questioned and evolve. Therefore, changes in warfare are the bane of military theorists who aim to provide principles guiding the practice of war, while theorists who focus on the generalities and motivations of war achieve far greater longevity. Of the latter, the nineteenth-century work of Carl von Clausewitz holds distinct prominence in American military teachings, yet the sixth-century B.C. theory of Sun Tzu is more prescient, especially in its ability to incorporate lasting prescriptions for warfare.³

Clausewitz's gift to military studies was an amazing theory on war that resulted from his exploration of the motivations influencing and limiting war's political aims. However, in describing his theory on war, he occasionally ventured into the realm of prescriptive advice for the conduct of war, and the weight of his influence contributed to a century of relatively unquestioning abidance to Napoleonic-style warfare. Clausewitz's theory on warfare revolved around massed armies, in rigid formation, pursuing decisive battle. However, adherence to that theory increasingly led to bloody wars of attrition as

technology wrought increasingly efficient mechanisms for killing. It took future gifts of science, most notably flight, to force a renaissance of theory, disrupt mechanistic Clausewitzian views, and restore Sun Tzu-like warfare valuing surprise, initiative, and flexibility.

Julian Corbett was one of the first to break from Napoleonic-era principles of warfare, and his maritime theory revealed that presumptions for land warfare were not universal to all domains. As airpower evolved, it also challenged the legacy of Clausewitz's prescriptions on warfare. Airmen like John Boyd and John Warden played a significant role in shifting emphasis from firepower and attrition to maneuver and deception. In doing so, they resurrected principles that harkened back to Sun Tzu. Boyd also emphasized the importance of a "mind-time-space schema"⁴ as an instrument to communicate a synthesized understanding of reality. He viewed these schemas as a way to facilitate initiative of distributed forces while achieving synchronization of effort in the context of a cognitive orientation to the relative world. Those thoughts reverberate today in the design-type thinking stemming from the work of Shimon Naveh. Both Naveh and Boyd espouse the necessity for discourse, challenging of assumptions, and exposure of the logic that underpins strategy; these three are the keys to unleashing initiative, disrupting enemy decision-making, and keeping an adversary off-balance. In aiming to defeat an enemy's strategy, modern theorists focus on the acme of Sun Tzu-like skill and place emphasis on maneuver, thinking, and asymmetric warfare instead of brute force, mass, and bloody pursuit of decisive battle. Indeed, theory on warfare is evolving, but it has returned to Sun Tzu roots. Meanwhile Clausewitz's theory on war remains as valid as it did two centuries ago.

Clausewitz – On War, not on Warfare

In the Western world, it is nearly impossible to study military theory without analyzing Clausewitz's work, and his theory of war remains relevant for two simple reasons. First, Clausewitz's explicit purpose in writing *On War* was to develop a lasting theory;⁵ therefore, he generally avoided discussion of tactics which might have limited the longevity of his work.⁶ Second, unlike theorists who merely accepted war as a natural part of human existence, Clausewitz explored the essence of war and factors that limit its aims.⁷

On War is a dialectic that drags a reader through a lengthy exploration of the essence of war. Reading his work, one has a sense of witnessing Clausewitz work out the logic of war in his own mind.⁸ While this provides fascinating insight into the process of human reasoning, it may actually dissuade critical thinking by hijacking the reader's mind. To be fair, Clausewitz's death preceded completion of *On War*,⁹ and historians note that Clausewitz's wife, and others, edited manuscripts prior to publication.¹⁰ Hence, the source of *On War*'s inconsistencies is unclear;¹¹ however, the distinct dialectical style of *On War* is an original sin of Clausewitz's own making.¹² Nevertheless, Clausewitz's thesis is most prophetic – war is the result of a “paradoxical trinity”¹³ of tendencies composed of the “blind natural force”¹⁴ of enmity, the rationale of political aims, and probabilistic calculus¹⁵ – passion, reasoned policy, and probability.¹⁶

Unfortunately, various translations of *On War* result in differing conclusions on what Clausewitz intended to convey. Howard and Paret's translation of *On War* is probably the most widespread version of Clausewitz's work, and their translation of Clausewitz's thoughts on the trinity lends itself to the use of physical analogy: “Our task therefore is to develop a theory that maintains a balance between these three

tendencies, like an object suspended between three magnets.”¹⁷ However, David Gillie disputes Howard and Paret’s translation, offering a more literal interpretation: “The task for theory, then, is to float (wander/isolate) freely in suspension between these three tendencies as between three points of attraction.”¹⁸ Grammatically, the former makes the task our responsibility (presumably guided by Clausewitz), while the later places responsibility on theory itself.¹⁹ The Howard and Paret translation also implies a concept of balance between the trinity of tendencies that ignores Clausewitz’s warning about trying to fix an arbitrary relationship between the three.²⁰ According to Clausewitz, theory must consider all three, yet they are “variable in their relationship to one another,”²¹ and any theory seeking “to fix an arbitrary relationship between them would conflict with reality.”²²

Scholars preferring the Howard and Paret translation sometimes use the analogy of a pendulum suspended between three magnets to extend Clausewitz’s thoughts in a manner that supports the notion of war as deterministic chaos.²³ Meanwhile, scholars preferring more literal translations remain unburdened by inconsistencies in the text and analogies that Clausewitz may not have even intended. Instead, they take a purist perspective, holding that Clausewitz only insisted that a theory of war must include consideration of each tendency. Raymond Aron and Janeen Klinger fall in the latter camp and consider war’s various forms a reflection of the limitless arrangement and relative strength of the Clausewitzian trinity’s elements.²⁴

Regardless of the debate emanating from various translations, an enduring takeaway from *On War* is the subjugation of warfare to political objectives.²⁵ Equally important is Clausewitz’s discussion of the inevitable “fog” and “friction” of war, where

fog is the result of inevitable uncertainty,²⁶ and friction is the outcome of natural stresses that render otherwise easy tasks difficult.²⁷ However, as is typical in *On War*, Clausewitz's discussion of fog and friction tends to be descriptive, while other theorists emphasize the value of accentuating these inevitable features. This inclination to be descriptive is appropriate for a book titled *On War*, versus if titled *On Warfare*, but there are points where Clausewitz ventures toward prescriptive advice.²⁸ Most significantly, he espouses that a commander-in-chief must function simultaneously as both a statesman and a general.²⁹ In functioning as a statesman, a commander-in-chief must keep political objectives in mind, yet functioning as a general demands the commander-in-chief remain realistic about the possibilities achievable with available resources.³⁰

In terms of modern strategy, political objectives drive the “ends” that actions are intended to achieve, whereas available resources are the “means” which the general may consider when conceiving “ways” to achieve the ends. This Ends-Ways-Means construct is a typical framework for discussing strategy, and Clausewitz's insight regarding the duality required of a commander-in-chief provides a perspective that is useful in settling a classic philosophical debate about the best approach to develop strategy. Many planners take an ends-centric perspective to developing strategy, arguing that the purpose is to identify the ways and means necessary to achieve desired ends. Alternatively, others hold a means-centric perspective and believe resources necessarily limit the ends which action can seek. Clausewitz clearly espouses the importance of a duality of perspective required at high command. Thus, debating the primacy of an ends-centric versus a means-centric perspective is pointless because the underlying question is a logical fallacy – a false dichotomy. While

academia may feel compelled to continue the debate, Clausewitz would suggest the debate is as pointless as arguments about whether war is more art or science.³¹

Unlike Clausewitz's theory on war, the limits of nineteenth-century knowledge abridged the longevity of his theory on warfare. Therefore, it may be unjust to criticize Clausewitz for failing to account for the uniqueness of operations in air, space, and cyberspace. However, it is fair to criticize his failure to address the uniqueness of the maritime domain. In fact, a perspective beyond merely the land domain may have helped Clausewitz take a strategic view on warfare, not just war, and could have helped future militaries avoid fixation on decisive battle, seizure of territory, and an imperfect center of gravity analogy.³² The center of gravity analogy has utility,³³ but it loses relevancy in the more fluid, decentralized, and distributed operations typical of contemporary American warfare.³⁴

As with any model or analogy, the center of gravity analogy is an incomplete representation of reality,³⁵ and too literal an interpretation extends the physical analogy beyond usefulness if it insists on the impossibility of more than a single source of strength³⁶ or place to focus effort.³⁷ For example, after Operation Desert Storm, Lieutenant Colonel Purvis expressed frustration that "the CENTCOM staff became more focused on what [the center of gravity] was as opposed to what do we do with it."³⁸ Remarkably, Antulio Echevarria notes in a Naval War College Review article that while some strategists and planners argue there can be only one enemy center of gravity, they simultaneously claim it can change or vary depending on a somewhat arbitrary notion of levels in war – strategic, operational, or tactical.³⁹ Clausewitz's inconsistent use of the center of gravity analogy is probably the source of much of the confusion, but

it also hints at the imperfections of the analogy. Thus, the analogy can facilitate fantastic academic debate, but an insistence on reducing complexity of war to a “single” center of gravity could also stifle options and encourage head-on, brute-force, clashes in search of decisive battle.

If Clausewitz’s center of gravity analogy had existed when France began its foray into Russia in 1812, Napoleon might have described Russia’s army as the center of gravity – basing strategy on the belief that he could force the Russian Army into decisive battle.⁴⁰ When decisive battle eluded him, Napoleon might have claimed Moscow was the center of gravity and thus justified his occupation of the Russian capital. However, with the benefit of hindsight, military historians can now argue that Russia’s center of gravity was the resolve of its people. A Russian force that was able to lose in battle, yet win the war, confounded Napoleon.⁴¹ Russians were willing to endure sacrifice while luring the French deep into the Russian heartland, even burning Moscow to keep the French from exploiting its refuge.⁴² In the end, the only thing decisive about Napoleon’s campaign into Russia was that it helped lead to the demise of the French Empire.⁴³

Fixation on a single center of gravity can lead to fixation on decisive battle, and there are clues that doctrine is taking new generations down the primrose path of Clausewitz’s dated prescription on warfare. Whereas U.S. Army doctrine previously defined *Full Spectrum Operations* as “simultaneous offensive, defensive, and stability or civil support operations,”⁴⁴ the latest version replaces *Full Spectrum Operations* with the term *Decisive Action*⁴⁵ – “continuous, simultaneous combinations of offensive, defensive, and stability or defense support of civil authorities tasks.”⁴⁶ Hence, either

U.S. Army doctrine now portends that any continuous synchronized action will be decisive, or more confusingly, that *Decisive Action* may not always be decisive. Furthermore, the doctrine claims that “effective decisive action relies on lethality,”⁴⁷ apparently discounting lessons of the past decade and ignoring the potential decisiveness of cyber, electronic, or *Unrestricted Warfare*⁴⁸ – a concept emanating from Chinese military theorists.

The point is not to argue that Clausewitz’s thoughts on warfare should be completely discarded, merely that they require increased skepticism in light of modern technology and the inseparable, overlapping, interdependent, and even intangible domains of modern warfare. The true power of his work is the descriptive theory that he offers for analyzing war, but if military leaders naively use Clausewitz as a guide to warfare, they may unnecessarily constrain opportunity by insisting on massing forces, for a presumed decisive battle, against an assumed single center of gravity. Remember, Clausewitz wrote *On War*, not *On Warfare*.

Sun Tzu – On War, and on Warfare

Amazingly, a Chinese general named Sun Tzu was professing a set of enlightening and pithy aphorisms on war and warfare two thousand years before Clausewitz.⁴⁹ Sun Tzu’s *The Art of War* is far more concise than Clausewitz’s *On War*, yet the insights it provides, in short, easy to remember verse, are remarkable.⁵⁰ His elegant, yet vague, pearls of wisdom have a certain ability to linger in the mind, and contribute to inquisitive reflection that a reader of Clausewitz may be discouraged from practicing. Although Clausewitz’s literary style makes it obvious that he valued his own critical thinking, Sun Tzu’s teachings actually encourage students of military theory to practice it more.

Sun Tzu offers a broad and intellectually engaging perspective for considering the role of strategy. Whereas Clausewitz's strategy is about military campaigning,⁵¹ Sun Tzu's concept contains elements that more closely reflect what is today understood as grand strategy. Sun Tzu and Clausewitz each recognized the connection between war and policy, but Clausewitz's experience as a European continental soldier, the period's indelible Napoleonic influence, and the relatively constrained geography of Western Europe prejudiced his perspective.⁵² Clausewitz saw battle between armies as the primary tool of war, while Sun Tzu viewed attacking armies as next to the last option, preferable only to attacking cities.⁵³

While there is no clear evidence that Clausewitz was aware of the Chinese master's work,⁵⁴ it is doubtful Clausewitz would have found it at fault. Nor should one expect that Sun Tzu would have differed with Clausewitz's conclusions about the forces that lead to and sustain war. However, Sun Tzu probably would have found Clausewitz's *On War* lacking in its ability to provide much practical insight to guide warfare. Both theorists saw war as a natural extension of state policy, inherently driven by estimates of the probability of success, and placing demands on the populous for support. However, their approach to warfare varies substantially, in the same way that classical Western philosophy differs from Eastern philosophy in regards to a general approach to life.

Whereas a low-lying Western city might build massive levies and pumping systems to prevent flooding, an Eastern approach would tend to accept the natural way of things. Instead of trying to keep the water out of its cities, the Eastern approach would be much more likely to build cities on stilts.⁵⁵ Similarly, Clausewitzian warfare

presumes that with sufficient effort and proper leadership, one can defeat any opponent through brute force and will. The Clausewitzian approach focuses on symmetric, army-versus-army warfare, with forces maneuvered to concentrate at the decided place and time to achieve victory, through mass and firepower, in decisive battle.⁵⁶ The Eastern approach to warfare takes an asymmetric, harassing approach, seeking to inflict maximum damage at minimum cost – a concept Clausewitz implies is purely fallacious.⁵⁷ Students of Sun Tzu disdain impatient cries for battle, believing that victory achieved by defeating the enemy's calculus, or strategy, is preferable to battle. Clausewitz cautions that most intelligence reports are contradictory, false, or unclear,⁵⁸ whereas Sun Tzu takes a strategic view, seeking intelligence to understand the enemy and recognizing that deception can amplify the natural fog of war.⁵⁹

Unwavering confidence in superior "military genius" and the ability to hold forces in reserve are typical Western approaches for coping with the fog and friction of war.⁶⁰ However, instead of merely trying to compensate for fog and friction, a student of Sun Tzu would seek to accentuate these natural phenomena through deception, cunning, speed, and stealth.⁶¹ Sun Tzu would encourage the use of misdirection to bolster one's image in the mind of the enemy, align one's strengths against the enemy's weakness, acknowledge natural propensities, and await the opportunity for an advantage.⁶²

The Western approach seeks to achieve advantage through positive action, whereas the Eastern approach is more patient. In a sense, Westerners seem to feel a compulsion and responsibility to take action that they can credit as resulting in victory, while Eastern cultures find it acceptable, even preferable, to let enemies exhaust

themselves.⁶³ The differences hint at Western and Eastern cultures' inclination toward active or passive aggression.⁶⁴

East Meets West – Twentieth-Century's Disruptions to Warfare

History is replete with evidence of the West's penchant for Clausewitzian-style warfare. However, the twentieth century's introduction of Sun Tzu's treatise into Western military studies has helped frame the experience of the century's wars and influenced the century's military theorists. The speed of communication, impact of radar, flexibility of airpower, awe of the atom, high-ground of space, power of computers, and resilience of networks have dramatically changed warfare. While Clausewitz's trinity continues to serve as a powerful explanation for war, technology has enabled Western warfare to retain its impatient roots while simultaneously increasing congruency with Sun Tzu's theory regarding warfare.

Today, Western warfare has shifted its focus from the psychological effect created by armies massing for decisive battle toward the psychological effect posed by the unknown, unseen, and unheard. In the early twentieth century, Julian Corbett enunciated the nuance of maritime theory, while others would follow in the mid-to-late century. Theorists like John Boyd and Shimon Naveh tackled cognitive processes to cope with emergent qualities of complex adaptive systems,⁶⁵ while John Warden gave theory physical form.⁶⁶

Julian Corbett – Relative Control of Vast Commons

Corbett's maritime theory espoused a concept of relative, or temporary, "command of the sea" and illuminated the infeasibility of continuously controlling the maritime environment.⁶⁷ His theory embraced the seas' ability to facilitate the avoidance of unfavorable battle, while discouraging massed navies.⁶⁸ In many ways, his theory is

contrary to traditional Clausewitzian warfare, and specifically contrary to Antoine-Henri Jomini's belief regarding superiority of internal lines of operation.⁶⁹ While internal lines of operation provide advantage from a traditional land-centric perspective, Corbett saw distinct advantage offered by exterior lines of operation in the maritime domain. He may have recognized a conceptual similarity between the vast maritime environment and the secluded accommodation offered by mountains, forests, and jungles, for his maritime theory is similar to guerilla warfare.⁷⁰

The global commons of air, sea, space, and cyberspace each possess a quality of vastness that limits control in the sense that one controls terrain, and at least one student of theory proffers Corbett's work as a basis for space-power theory.⁷¹ While topography defines the maritime domain's convergence with land, convergence with land is less constraining for air, space, or cyber theory. Of the three, airpower theory is most mature; it espouses the exploitation of speed, maneuverability, misdirection, and stealth to bypass territorial defenses and strike directly at strategic vulnerabilities.⁷² Moreover, space and cyber theorists are likely to think in similar terms,⁷³ for as one concludes from Robert Kaplan's book, *The Revenge of Geography*, topography remains important, but air, space, and cyber power makes it less so.⁷⁴

Early Airpower Theory – Struggles with Disruptive Opportunity

Although first used as a reconnaissance platform, theorists soon realized that airplanes could help direct land and maritime forces, provide protection from enemy aircraft, and attack enemy forces directly.⁷⁵ More significantly, theory contemplated aircraft in more than just a support role, as the third dimension highlighted a potential to break from Napoleonic-style warfare and bypass fielded forces to strike directly at the heart of an enemy. By the early 1920's, Italian airpower theorist Giulio Douhet was

espousing a belief that only a single type of aircraft “should make up the operating mass of an Independent Air Force,”⁷⁶ and he called it a “battleplane.”⁷⁷ Similarly, the U.S. Army’s Air Corps Tactics School (ACTS) envisioned something akin to flying battleships, with the idea of conducting unescorted bombing missions.⁷⁸ There was a general belief that “the bomber will always get through,”⁷⁹ and a presumption about bombing accuracy that failed to recognize atmospheric complexities.⁸⁰ Moreover, notions of rigid massed formations, decisive battle, and an enemy’s center of gravity held early airpower theory hostage, stifling innovative application of a disruptive technology.⁸¹

As Clayton Christensen points out in *The Innovator’s Dilemma*, it is extremely difficult for disruptive technologies to flourish in well-established businesses because disruption requires organizations to discard long-held concepts and measures of value – something that is harder to do than most people realize.⁸² Similarly, Andrew Hill exposes in a paper entitled “The Shock of the New: Innovation in Military Organizations,” that this dilemma also exists in the military. Hill notes that in “the United States military...innovation is not a scientific or technical problem; it is an organizational challenge.”⁸³ The bureaucracy of large organizations can result in an inertia that is difficult to overcome, and they often fail to recognize an innovation’s potential. However, unplanned circumstances often enable disruptive technologies to find a niche and eventually lead to the dislocation of previously dominant technologies, methods, processes, and concepts.⁸⁴ Hence, there is ironic familiarity in noting that post-World War I restrictions on Germany’s military programs drove them to develop theory that

would expose the disruptive nature of airpower.⁸⁵ Meanwhile, the Allies continued to think in terms of a battleplane, even as the era of the battleship was starting to wane.

The battleship would soon prove to be no match against the flexibility, speed, and maneuverability demonstrated by non-rigid swarms of lightly armored fighter-bombers. On 7 December 1941, the Japanese attack on Pearl Harbor made this point painfully clear and vindicated the oft-accosted predictions of previously court-martialed airpower theorists like Billy Mitchell.⁸⁶ Centralized command utilizing decentralized control of airpower, through mission-type orders, enabled distributed operations to achieve strategic effects and presaged John Boyd's future conclusion that the unshackling of initiative enables rapid decision-making and maneuverability that can paralyze an enemy.

John Boyd – Maneuver Warfare

Described by military biographer Robert Coram as the greatest military theorist since Sun Tzu,⁸⁷ John Boyd's brash, foul-mouth personality gave him a well-deserved reputation as a maverick.⁸⁸ That reputation and a penchant for slide presentations are probably the reasons that most students of warfare do not study his contribution to theory in much detail.⁸⁹ However, it is interesting to observe that discussions about Strategic Landpower, the Human Domain, and adding "Influence"⁹⁰ as a possible seventh U.S. Army warfighting function seem to arrive at the same conclusion as Boyd's successors.⁹¹ The essence of that conclusion is simple: tactical action means little if it does not have a strategic effect on human behavior.⁹² This concept is not new, but the fact that it continues to arise as if it were a novel discovery suggests that the concept is easily overshadowed by fixation on battle, instead of battle's purpose.

Typical fighter pilots may know John Boyd as the father of the Energy-Maneuverability (EM) Diagram, but they probably do not know that as a Captain, Boyd went back to undergraduate school to study engineering.⁹³ Already regarded as one of the best fighter pilots in the Air Force, he was seeking scientific theory to explain what experience had taught him about aerial combat maneuvering. The Air Force initially denied his request, but eventually acquiesced under Boyd's infamous persistence. The result was an undergraduate Captain inventing a method to compare the maneuverability of aircraft based on laws of thermodynamics.⁹⁴ Boyd would forever see the analysis and synthesis of diverse concepts as a powerful force for shaping understanding and guiding action.

In the years that followed, Boyd and his theory disrupted the status quo of fighter aircraft design by challenging underlying value models.⁹⁵ He also challenged broader notions of existing warfare theory, and his willingness to question unstated assumptions is largely what made him an unsung legacy in the annals of modern warfare. John Boyd became the key intellectual powerhouse behind doctrine for maneuver warfare and the development of AirLand Battle as an operational concept.⁹⁶ That concept turned post World War II manning, equipping, and training concepts on their head by replacing the U.S. military's "emphasis on firepower and attrition with a more fluid doctrine based on maneuver and deception."⁹⁷

In retirement, a slide presentation entitled "Patterns of Conflict," became Boyd's preferred forum for communicating conclusions about the art of war and his "time-based theory of conflict."⁹⁸ The presentation demonstrated a profuse fondness of Sun Tzu's teachings while highlighting the fallacy of overly prescriptive and constraining, top-down,

attrition-based warfare that emanated from the study of Napoleon, Clausewitz, and Jomini.⁹⁹ While he believed Napoleon demonstrated a remarkable degree of adaptability and flexibility at his level, he noted that Napoleon's tactics depended on rigorous drill-like discipline that failed to allow initiative once the battle had begun.¹⁰⁰ Unfortunately, nineteenth-century militaries wed themselves so much to the idea of massed armies that they became dependent on large-scale logistics that telegraphed movement while it "suppressed ambiguity, deception, and mobility."¹⁰¹

By 1990, maneuver warfare doctrine espoused many of Boyd's concepts, but few military officers outside of the Marine Corps were aware of the tremendous role Boyd had played in preparing the military for Operation Desert Storm.¹⁰² His unconventional thinking and "Patterns of Conflict" presentation gained many followers in the business world, but also within powerful political circles.¹⁰³ Richard Cheney, Secretary of Defense at the time, credits John Boyd as a major influence in the decision to shift the ground campaign from a classic Clausewitzian frontal-attack, to the Sun Tzu-like plan known as "the left hook."¹⁰⁴ Similarly, Commandant of the Marine Corps General Charles Krulak credited Boyd's influence for the success of the campaign saying, "John Boyd was an architect of that victory as surely as if he'd commanded a fighter wing or a maneuver division in the desert."¹⁰⁵ That is quite a tribute from a Marine about an Airman who had retired fifteen years before Iraq invaded Kuwait.

Boyd had a fundamental belief in the importance of thinking in terms of "mind-time-space,"¹⁰⁶ and his unpublished 1976 paper entitled "Destruction and Creation"¹⁰⁷ provides insight on his philosophical perspective of looking at the world through the lens of continual analysis and synthesis – a process he called a Conceptual Spiral.¹⁰⁸ In

classic Boyd fashion, the paper synthesized Heisenberg's *Uncertainty Principle* and Gödel's *Incompleteness Theory* to emphasize the certainty of imperfect knowledge and the continual need to question the context of a problem.¹⁰⁹ Boyd's goal was to create "a foundation for vitality and growth, or in a more formal sense...a foundation for comprehending, shaping, and adapting in an unfolding, adapting reality that is uncertain, ever-changing, [and] unpredictable."¹¹⁰ Nearly three decades later, advocates of a concept called Design were similarly discussing "problem setting"¹¹¹ or "problem framing"¹¹² as a way to cognitively cope with a Volatile, Uncertain, Complex, and Ambiguous (VUCA) world.¹¹³ In delivering his "Patterns of Conflict" presentation, Boyd would frequently comment that "progress is the creation of confusion at a higher level,"¹¹⁴ and it is remarkable how consistent that concept is with the ideas conveyed by retired Israeli Brigadier General Shimon Naveh when discussing development of Systemic Operational Design (SOD).¹¹⁵

John Warden – The Enemy as a System

While John Boyd was instrumental in shaping the doctrinal, material, and intellectual foundation of late-twentieth century warfare, Colonel John Warden deserves credit for giving Boyd's maneuver warfare theory an analogous form. Often credited with being the architect of the 1991 Gulf War air campaign, Colonel John Warden's theory of warfare conceptualizes the enemy as a living system with nominally five concentric subsystems.¹¹⁶ Contrary to mechanistically focusing on a single center of gravity, Warden's conceptualization presents multiple opportunities to leverage vulnerabilities in each subsystem.¹¹⁷ He compares these enemy subsystems to the subsystems of the body: leadership (brain), organic essentials (food and oxygen), infrastructure (blood

vessels, bones, and muscles), population (cells), and fighting mechanisms (white blood cells).¹¹⁸

In Warden's abstract system, a brain-like command element synchronizes the five critical subsystems, yet the system depends on each of the subsystems. Warden believed the best way to counter the innate adaptability of an enemy was to attack the subsystems through parallel, versus sequential, warfare.¹¹⁹ Warden's theory attempts to free warfare of the cognitive limitations of serial, attrition warfare, while holding that the synergistic effect of parallel warfare results in greater coercive pressure than the mere sum of each action.¹²⁰ Inputting disruptive energy into each subsystem should prevent an enemy from being able to adapt, perhaps even creating self-defeating emergent characteristics in the wake of induced confusion. Most notably, it completely discards the notion of a single enemy center of gravity.¹²¹

Whereas Clausewitz drew upon the language of early Newtonian physics to describe concepts such as an enemy's center of gravity, Warden's theory drew linguistic and conceptual inspiration from Systems Theory and Cybernetics while remaining consistent with Sun Tzu and Boyd-like theories of warfare.¹²² Not surprisingly, Systems Theory and Cybernetics offer a logical starting point for a much-needed theory of cyber warfare, yet the study of Boyd suggests inspiration might arrive from synthesis of disparate fields.

Shimon Naveh – Systemic Operational Design

Similar to Warden, Systems Theory influenced Shimon Naveh's perspective, but his study of postmodern French philosophy, literary theory, psychology, and architectural design also had a significant influence.¹²³ Like Boyd and Warden, Naveh's thinking appears distinctly Sun Tzu-like in its attempt to outthink the enemy, exploit

surprise, and seek asymmetric opportunities to render an enemy's strategy ineffective.

According to Naveh:

The enemy interprets space in a traditional, classical manner, and I do not want to obey this interpretation and fall into his traps. Not only do I not want to fall into his traps, I want to surprise him! This is the essence of war. I need to win. I need to emerge from an unexpected place...This is why we opted for the methodology of moving through walls...Like a worm that eats its way forward, emerging at points and then disappearing.¹²⁴

Compared to Warden, Naveh is less prescriptive in offering a framework for modeling a "rival."¹²⁵ Warden provides a five-ring, bio-inspired framework picturing an enemy as a living system, while Boyd and Naveh focus more on the demand for rigorous intellectual examination and discourse regarding underlying cognitive beliefs.

Although Sun Tzu-like, Naveh's concept of Design emerges from the study of architectural design and a desire to differentiate the thought processes associated with Design from the process of military planning. Unfortunately, like Boyd, Naveh expresses most of his thoughts through briefing slides and he uses an overly active vocabulary that isolates his concepts from most military practitioners.¹²⁶ Even the fact that the word "Design" can be used linguistically as either a noun or verb has been the source of some confusion and debate. Is Design something that one performs – a verb? Alternatively, is Design the product of some activity – a noun?¹²⁷

The noun argument could stem from common architectural analogies where architects produce designs, architectural engineers produce plans, and then builders use plans to guide the work of artisans. The analogy is useful if one appreciates how an architect must engage in a set of dialogues with a sponsor. While the sponsor usually has some initial vision in mind, the architect may only realize what the sponsor desires through the presentation of options that generate discussions of fiscal, physical, cultural,

and other limitations. The sponsor and architect cooperatively agree on a design through a process of discovery that allows both to emerge with an understanding of the rationale behind necessary choices.¹²⁸ The sponsor's vision shapes, and is shaped by, the architect. Similarly, the architect shapes, and is shaped by, the sponsor's desire, engineer's plans, builder's schedule, and artisan's skill.¹²⁹

While this architectural analogy may be helpful in thinking about the conceptual difference between designing and planning, it is surely not perfect, and thinking about Design as a noun can lead to confusion about the role of a design versus a strategy, or a plan. However, if one considers the underpinning and emphasis of Design, then the verb form appears to have more utility and fits better within existing military lexicon. In this sense, one can talk linguistically and cognitively about "designing a strategy" with logical consistency between Ends, Ways, and Means.¹³⁰

According to Naveh, Design requires a discourse and a scrutiny of mental constructs.¹³¹ This is a logical extension of an important concept embedded within the "orient" phase of Boyd's frequently over-simplified Observe, Orient, Decide, and Act Loop (OODA Loop).¹³² However, perhaps because he was a soldier, Naveh's work garnered more attention by the U.S. Army as it sought to distinguish between a concept-driven method to design strategy and a planning process that many officers view as linear and checklist-driven.¹³³

In recent years, the overly academic language has started to fade from discussions of Systemic Operational Design, Campaign Design, Operational Design, and Design. Joint doctrine has increasingly embraced the concept, and design-type thinking has become a part of Professional Military Education (PME) courses such as

the Joint Combined Warfighting School and the various staff and war colleges. However, the premise of design-type thinking is the application of systems, critical and creative thinking to facilitate iterative analysis and synthesis. The military should inculcate these skills at all levels if they truly hope to embrace a philosophy of command that practices decentralized control to enable initiative. At the same time, trust and confidence must become the motivation for individual action, but this may be difficult to achieve in a culture that revolves around inviolable deference to rank. These are not exclusive concepts, but initiative derives from trust and confidence, not merely legal authority and obligation.¹³⁴

Conclusion

Before his death, Clausewitz indicated that he hoped *On War* would last more than “two or three years,”¹³⁵ and the fact that it is widely studied nearly two hundred years later suggests he achieved his aim. *On War* provides a prophetic theory summarizing the confluence of tendencies and motivations leading to war and limiting its aims, and his descriptive theory on war remains prescient today. However, theory on warfare stagnated for over a century under the influence of his prescriptions for the conduct of war. As technology and industrialization increased the efficiency of killing, Clausewitzian-style theory of warfare continued preaching the virtue of mass and postulating decisive engagement while ignoring surprise and maneuverability.

In contrast to Clausewitz, Sun Tzu’s principles for warfare have demonstrated an amazing ability to survive the clash of time and technology. Throughout the twentieth century, technology continued to increase the lethality of firepower, but it also enabled a renewed focus on speed, stealth, and maneuverability. While many technologies were at play, none necessitated a departure from Clausewitzian-style warfare more than the

invention of the airplane. It changed the speed and dimensions of warfare while lifting many geographical constraints and resulted in a renaissance of Sun Tzu-like theories on warfare. Central to that renaissance was John Boyd's willingness to question conventional wisdom. His ability to critically analyze and creatively synthesize diverse viewpoints enabled him to see answers to questions others refused to ask.

In many ways, Boyd's approach to theory was similar to Shimon Naveh's design-type thinking and, in essence, allowed Julian Corbett and John Warden to provide their contributions to theory. Emerging space and cyber theory may be able to draw upon existing maritime and parallel warfare theory, respectively; however, theorists must be willing to accept that these new domains could disrupt existing notions of warfare. Students need to question the validity of theories of war and warfare; otherwise, the development of these theories will stagnate once more. Design-type thinking is the key to opening eyes to the possibilities of imagination, but cultural barriers to its development must fade.

Endnotes

¹ Alex Ryan, "Introduction to Systemic Design," December 11, 2013, <http://prezi.com/5sfncgsc7g-n/introduction-to-systemic-design/> (accessed March 12, 2014). The quoted text is a common paraphrase of the translated text from Marcel Proust's book entitled *À la Recherche du Temps Perdu*. C. K. Scott Moncrieff translated the version published in English as *Remembrance of Things Past*. The original translation by Moncrieff: "The only true voyage of discovery, the only fountain of Eternal Youth, would be not to visit strange lands but to possess other eyes." Marcel Proust, *Remembrance of Things Past*, trans. C. K. Scott Moncrieff (New York: Random House, 1934).

² Kenneth N. Waltz offers the following thought on theory: "A theory, though related to the world about which explanations are wanted, always remains distinct from that world. 'Reality' will be congruent neither with a theory nor with a model that may represent it." Kenneth N. Waltz, *Theory of International Politics* (Long Grove, IL: Waveland Press, 2010), 6.

³ In the forward to a translation of Sun Tzu's *The Art of War*, B.H. Liddell Hart comments that "amongst all the military thinkers of the past, only Clausewitz is comparable, and even he is

more 'dated' than Sun Tzu." Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (New York: Oxford University Press, 1963), v.

⁴ John Boyd, "Patterns of Conflict," *Air Power Australia*, <http://www.ausairpower.net/JRB/poc.pdf> (accessed February 24, 2014), 74. Boyd describes a "mind-time-space schema" as "a common outlook possessed by 'a body of officers' [that] represents a unifying theme that can be used to simultaneously encourage subordinate initiative yet realize superior intent."

⁵ Carl von Clausewitz, *On War*, trans. and eds. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 63.

⁶ *Ibid.*, 134. Clausewitz said an "irreconcilable conflict" exists between theory "to equip the conduct of war with principle" and the actual practice of war. *Ibid.*, 134.

⁷ Whereas Clausewitz saw war as an instrument of policy, a fourth-century B.C. Indian philosopher known variously as Kautilya, Chanakya, or Vishnu Gupta, tended to see policy as an instrument of war. If Kautilya had lived in the nineteenth century, he might have argued with Prussian general, historian, and theorist, Carl von Clausewitz's conclusion about the futility of contemplating "absolute war," but from a perspective of not wanting to limit the methods of war – namely warfare. Nevertheless, given Kautilya's background in economics, he would likely have found solace in Clausewitz's analysis of the nature of war and his theory about human nature's proclivity to engage in probabilistic calculus when making decisions regarding the aims of war. Glenn K. Cunningham, "Eastern Strategic Traditions: Un-American Ways of War," in *U.S. Army War College Guide to National Security Issues*, 5th ed., Vol. 1. (Carlisle Barracks, PA: Strategic Studies Institute, 2012), 133-143; Kautilya, *Arthashastra*, trans. R. Shamasastri (Bangalore, India: Government Press, 1915).

⁸ Clausewitz walks his readers through the *creation* and *destruction* of his own ideas. Without sufficient warning, this linguistic style can be confusing for a reader, but it is essentially the scientific method in prose – hypothesis, analysis, and synthesis. Emphasis was placed on the words creation and destruction as an allusion to later references to John Boyd's paper entitled "Destruction and Creation."

⁹ Clausewitz, *On War*, 65.

¹⁰ Christopher Bassford, "Clausewitz and His Works," March 18, 2013, <http://www.clausewitz.com/readings/Bassford/Cworks/Works.htm> (accessed March 12, 2014).

¹¹ There are multiple sources discussing contradictions and inconsistencies in *On War*. Joseph Strange and Richard Iron address inconsistencies regarding Clausewitz's center of gravity analogy in Joseph Strange and Richard Iron, "Understanding Centers of Gravity and Critical Vulnerabilities," <http://www.au.af.mil/au/awc/awcgate/usmc/cog2.pdf> (accessed March 13, 2014). Another reference is Eugenio Diniz and Domício Proença, "A Criterion for Settling Inconsistencies in Clausewitz's *on War*," *Journal of Strategic Studies* (2012).

¹² Clausewitz's dialectical style is a slow, brooding approach that would just as likely infuriate someone today, as did the dialectical approach practiced by ancient Athenian philosophers such as Socrates and Plato – a style known as the Socratic Method.

¹³ Clausewitz, *On War*, 89. Various scholars prefer translations such as “miraculous,” “remarkable,” “fascinating,” and “paradoxical.” Those favoring “miraculous” note Clausewitz used the same German phrase that describes Christianity’s Holy Trinity, while those who favor “remarkable” or “fascinating,” over “paradoxical,” may fail to see as a lack of any paradox. However, the weighing of passion and reason seems indeed a paradox of choice between human motivations of the heart and mind, yet the most fascinating or remarkable idea is in contemplating a notion of stability for the Clausewitzian trinity. Hew Strachan and Andreas Herberg-Rothe, *Clausewitz in the Twenty-First Century* (Oxford: Oxford University Press, 2007), 44, 72-79; National War College, "Clausewitz I & II - Instructors Guide," <http://www.clausewitz.com/readings/NWC/ClausewitzNotesAY2008.htm> (accessed February 25, 2014).

¹⁴ Clausewitz, *On War*, 89.

¹⁵ Ibid.

¹⁶ Thucydides’ *History of the Peloponnesian War* provides remarkable accounts of how fear, honor, and interest, are motivations both of, and in, war. However, Clausewitz more clearly extracts these motivations to compose a theory on the influences of war. The works of the two authors are complementary for the study of war.

¹⁷ Clausewitz, *On War*, 89.

¹⁸ David R. Gillie, "Interpreting Clausewitz’s Miraculous Trinity - Thesis, Antithesis, Synthesis: A Study of the Essential Intellectual Content and Didactic Purpose of the Trinitarian Model," *National War College*, December 9, 2009, <http://www.clausewitz.com/readings/Gillie-ThesisAntithesisSynthesis.htm> (accessed February 25, 2014).

¹⁹ Ibid.

²⁰ Ibid. Clausewitz’s warning about trying to fix an arbitrary relationship between the elements of the trinity is contained in the sentence immediately preceding his comments that have generated debate.

²¹ Clausewitz, *On War*, 89.

²² Ibid.

²³ Bassford, "Clausewitz and His Works." In this analogy, the apparent complexity is dependent on the magnitude of the disturbance, as well as the strength and position of the magnets in relation to the pendulum. For additional information, see Christopher Bassford, "Teaching the Clausewitzian Trinity," 2007, <http://www.clausewitz.com/readings/Bassford/Trinity/TrinityTeachingNote.htm> (accessed December 22, 2013).

²⁴ Janeen Klinger, "The Social Science of Carl von Clausewitz," *Parameters*, <http://oai.dtic.mil/oai/oai?&verb=getRecord&metadataPrefix=html&identifier=ADA486428> (accessed February 23, 2014).

²⁵ Clausewitz, *On War*, 88.

²⁶ Ibid., 101.

²⁷ Ibid., 121.

²⁸ The idea of Clausewitz writing a descriptive, instead of prescriptive, theory is found in many sources. Whether that is a positive or negative does not seem to be debated. Hew Strachan tends to comment on this nature as a positive feature, and it is probably what has helped with the longevity of Clausewitz's theory on war. Strachan and Herberg-Rothe, *Clausewitz in the Twenty-First Century*, 80.

²⁹ Clausewitz, *On War*, 112. Eliot Cohen's book, *Supreme Command*, provides an interesting examination of civil-military relations required when the statesman and general are not the same person. Eliot A. Cohen, *Supreme Command: Soldiers, Statesmen and Leadership in Wartime* (New York: The Free Press, 2003).

³⁰ Clausewitz, *On War*, 112.

³¹ Ibid., 149. Clausewitz states "war does not belong in the realm of arts and sciences; rather it is part of mans' social existence."

³² Rudolph Janiczek offers a perspective on the confusion and disagreement over interpretations of the center of gravity analogy. Rudolph M. Janiczek, "A Concept at the Crossroads: Rethinking the Center of Gravity," *Strategic Studies Institute*, <http://www.clausewitz.com/bibl/Janiczek-ConceptAtTheCrossroads.pdf> (accessed March 13, 2014).

³³ The utility of the center of gravity analogy is that it provides a warning about maintaining a degree of coordination to ensure unity of effort / purpose.

³⁴ Antulio Echevarria seems to concur with this author's conclusion about the applicability of the center of gravity analogy in distributed warfare, as indicated in an article he published a decade prior. Antulio J. Echevarria II, "Clausewitz's Center of Gravity: It's Not What We Thought," *Naval War College Review* 61, no. 1 (Winter 2003): 115.

³⁵ Interpreted too literally, the center of gravity analogy implies a degree of mechanistic determinism that is inconsistent with a world dominated by humanistic indeterminism. Mechanistic Determinism – Events are completely determined and caused by previous events. Mechanistic Indeterminism – Events are not completely determined or caused by previous events and regardless of the amount of information obtained, it is still not possible to predict or explain any causality. Humanistic Indeterminism should imply a degree of indeterminism even greater than Wesley Salmon implies with the term "mechanistic determinism." Wesley C. Salmon, *Causality and Explanation* (Oxford: Oxford University Press, 1998), 37.

³⁶ Bassford, "Clausewitz and His Works." Bassford tends to reference the center of gravity as the source of an enemy's strength.

³⁷ Echevarria II, 117. Echevarria prefers to think of the center of gravity as the point at which efforts should be focused to defeat an enemy. He believes Clausewitz intended more of an "effects-based" approach, instead of a capabilities-based approach, in thinking about centers of gravity. An effects-based approach makes Echevarria consistent with maneuver and parallel

warfare discussed later in this paper; however, Echevarria seems concerned that John Warden's parallel warfare can result in "so many COGs as to reduce the concept to an absurdity." In essence, that may be the problem with the center of gravity analogy, and in expressing concern Echevarria appears to fall into the ground-centric tendency of desiring only a few key (ideally one) centers of gravity to accommodate the massing of forces. Ibid., 108-109.

³⁸ Collin A. Agee, *Peeling the Onion: The Iraqi Center of Gravity in Desert Storm*, SAMS Monograph (Fort Leavenworth, KS: US Army Command and General Staff College, July 4, 1992), 26-27.

³⁹ Echevarria II, 116-117.

⁴⁰ Richard K. Riehn, *1812: Napoleon's Russian Campaign* (New York: McGraw-Hill, 1990), 226.

⁴¹ Harry Summer recounts a similar situation with the American experience in Vietnam. Although the literal validity of the facts may be in question, the following conversation is still prescient: "You know you never defeated us on the battlefield," said the American colonel. The North Vietnamese colonel pondered this remark a moment. "That may be so," he replied, "but it is also irrelevant." Harry G. Summers, *On Strategy: A Critical Analysis of the Vietnam War* (Novato, CA: Presidio Press, 1982), 1.

⁴² Riehn, *1812: Napoleon's Russian Campaign*, 285.

⁴³ Adam Zamoyski, *Moscow 1812: Napoleon's Fatal March* (New York: HarperCollins, 2004), 544. Napoleon's failed analysis of Russian determination played a significant role in the failure of his Russian campaign, the disintegration of his army, an inability to confront a crippling guerilla war in the Montaña of Spain, and the eventual collapse of the French Empire. The consequences of Napoleon's insistence on trying to obtain a decisive battle against the Russian Army should be a warning to those who insist on trying to identify a single center of gravity and to those who think they can predict what will be decisive in a complex, adaptive, human-based system.

⁴⁴ U.S. Department of the Army, *Operations*, FM 3-0 (Washington DC: U.S. Department of the Army, 2008), viii.

⁴⁵ U.S. Department of the Army, *Unified Land Operations*, ADRP 3-0 (Washington DC: U.S. Department of the Army, 2012), v.

⁴⁶ Ibid., 2-2.

⁴⁷ Ibid., 2-13. Historian Hans Delbruck famously postulated the existence of two fundamental strategies for war – annihilation and attrition strategies. After more than a decade of operations in Iraq and Afghanistan, it is difficult to comprehend the U.S. Army's apparent preoccupation with annihilation strategy thinking (Decisive Action). A few examples of militaries going to war with a false expectation of a short decisive campaign include: Napoleon's campaigns in Spain, Calabria, and Russia; Germany's Operation Barbarossa against the Soviet Union, America's Vietnam War, Operation Enduring Freedom, and Operation Iraqi Freedom.

⁴⁸ Liang Qiao and Xiangsui Wang, *Unrestricted Warfare: China's Master Plan to Destroy America*, trans. CIA Foreign Broadcast Information Service (Panama City, Panama: Pan American Publishing, 2000). *Unrestricted Warfare*, a book written by two Chinese Colonels and translated by the CIA's Foreign Broadcast Information Service (FBIS), espouses a theory termed "beyond-limits combined war." The central theme is that non-military means are the best way to attack the United States and suggests targeting information hubs within multiple echelons of the American system. The authors do not suggest that there are "no limits" in warfare. Instead, they advocate going "beyond" normal boundaries to conduct a systemic attack on multiple components of an enemy's system.

⁴⁹ There is some debate about whether Sun Tzu ever existed, or whether the works attributed to him are the result of a collaboration of thoughts in the Warring States period of Chinese history (453 – 421 B.C.). Reference the introduction by translator Samuel Griffith in Sun Tzu, *The Art of War*, 1.

⁵⁰ Short, easy to remember verse was probably more important for communicating ideas in sixth-century B.C. Asia than it was in nineteenth-century Europe.

⁵¹ Clausewitz, *On War*, 128.

⁵² It is interesting to contemplate whether the great expanse of ancient China contributed to theories that more closely resemble maritime theory than the emphasis on decisive battle found in the writings of Clausewitz and Antoine-Henri Jomini.

⁵³ Sun Tzu, *The Art of War*, 78.

⁵⁴ As Clausewitz's opens *On War*, he provides a comment on the maximum use of force which may be a faint allusion to an axiom of Sun Tzu, but it would be a stretch to deduce that this implies Clausewitz was aware of Sun Tzu's writing based on this one comment. Clausewitz states, "Kind-hearted people might of course think there was some ingenious way to disarm or defeat an enemy without too much bloodshed, and might imagine this is the true goal of the art of war. Pleasant as it sounds, it is a fallacy that must be exposed: war is such a dangerous business that the mistakes which come from kindness are the very worst." Clausewitz, *On War*, 75. Sun Tzu argues, "To subdue the enemy without fighting is the acme of skill. Thus, what is of supreme importance in war is to attack the enemy's strategy; next best is to disrupt his alliances; the next best is to attack his army. The worst policy is to attack cities. Attack cities only when there is no alternative." Sun Tzu, *The Art of War*, 77-78.

⁵⁵ Conclusion based on reading François Jullien, *A Treatise on Efficacy: Between Western and Chinese Thinking*, trans. Janet Lloyd (Honolulu: University of Hawaii Press, 2004). Many people in both Eastern and Western cities remain in low-lying areas and vulnerable to flooding, but this seems to be more a function of geography and resources than what their philosophical approach might be to confront flooding.

⁵⁶ Defensively, the Clausewitzian approach might seek to blunt, block, or absorb an enemy's attack, while a student of Sun Tzu would be more likely to talk in terms of deflecting or dodging an opponent's offensive efforts in order to preserve strength for a more advantageous situation.

⁵⁷ Clausewitz, *On War*, 75.

⁵⁸ Ibid., 117.

⁵⁹ Sun Tzu, *The Art of War*, 9.

⁶⁰ Clausewitz, *On War*, 100-101, 119. Careful reflection allows a military officer to develop the qualities of Clausewitz's "military genius" or Gary Klein's "experts" which he describes in his book entitled *Sources of Power*. Experience allows these elites to skillfully recognize familiar aspects of complex situations and quickly develop "high-quality" courses of action. "Experts can perceive things that are invisible to novices." Klein's research found that the first course of action reasonably considered by an expert is usually as good, or nearly as good, as the ones they choose when time is not a factor. Klein calls this skillful application of experience Recognition-Primed Decision-making (RPD). Gary A. Klein, *Sources of Power: How People Make Decisions* (Cambridge: MIT Press, 1999), 16, 175. Similarly, Clausewitz notes that the military genius should "in all doubtful cases stick to one's first opinion and refuse to change unless forced to do so by a clear conviction." Clausewitz, *On War*, 108. Martin Van Creveld simply refers to these decisions as emanating from intuitive judgment, but it is clear that they each recognize the value of experience, training, and practice. Martin L. Van Creveld, *Command in War* (Cambridge: Harvard University Press, 1985), 267.

⁶¹ Sun Tzu, *The Art of War*, 9, 98.

⁶² Ibid., 83.

⁶³ Ibid., 85. Sun Tzu said "Invincibility depends on one's self; the enemy's vulnerability on him."

⁶⁴ The Association of Southeast Asian Nations (ASEAN) has been successful in forming an ASEAN identity that trumps many elements of nationalism and coalesces around a unified, multilateral, and consensus based passive-aggressive balance of power mechanism to thwart aggressive assertiveness. The so-called "ASEAN Way" has generally proven effective at preventing armed interstate conflict in Southeast Asia and has indirectly enlisted the power of U.S. military deterrence against a rising China while also allowing the U.S. to avoid taking sides with any particular ASEAN member. For more information regarding the "ASEAN Way," see Gillian Goh, "The 'ASEAN Way': Non-Intervention and ASEAN's Role in Conflict Management," *Stanford Journal of East Asian Affairs* 3, no. 1 (Spring 2003).

⁶⁵ John Boyd and Shimon Naveh are two modern military theorists who seem to address the need for improved cognitive frameworks of warfare to provide "Decision Advantage" in what many people see as an increasingly complex environment. John Boyd's theory is best known in military and business circuits by his famous OODA Loop (Observe, Orient, Decide, Act). Shimon Naveh's theory of Systemic Operational Design was the genesis of the U.S. Army's exploration of concepts that have led to "Design." Naveh's theory shows strong signs of being influenced by Systems Theory and his conceptual processes are very similar to Boyd's OODA loop, even if more specific in purpose. Like Boyd, Naveh has been a controversial figure because of his intellectually demeaning character. He published a book in 1997 that provides some insights into his views on Operational Theory. For more information, see John Boyd, "Destruction and Creation," http://www.goalsys.com/books/documents/DESTRUCTION_AND_CREATION.pdf (accessed December 19, 2013); Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*, The Cummings Center Series (London: Frank Cass, 1997).

⁶⁶ David S. Fadok, *John Boyd and John Warden: Air Power's Quest for Strategic Paralysis*, SAASS Thesis (Maxwell Air Force Base, AL: Air University, 1995), 3. Fadok's thesis on John Boyd and John Warden is the source of the idea that Warden gave "form" to Boyd's "process" focused theory.

⁶⁷ Julian Stafford Corbett, *Some Principles of Maritime Strategy* (Annapolis, MD: Naval Institute Press, 1988), 103-105.

⁶⁸ *Ibid.*, 129-134.

⁶⁹ Interior and Exterior lines of operation are concepts most often associated with Antoine-Henri Jomini. While Jomini contended that interior lines were stronger than exterior lines, there seems to be a strong case that his contention only applies to traditional land warfare. For more on Jomini's theory, see Antoine-Henri Jomini and Horace E. Cocroft, *The Art of War*, trans. G. H. Mendell and W. P. Craighill (Rockville, MD: Arc Manor, 2007).

⁷⁰ Che Guevara, *Guerrilla Warfare*, ed. Marc Becker (Lincoln: University of Nebraska Press, 1998), 25.; John Lawrence Tone, *The Fatal Knot: The Guerrilla War in Navarre and the Defeat of Napoleon in Spain* (Chapel Hill: University of North Carolina Press, 1994).

⁷¹ John J. Klein, "Corbett in Orbit: A Maritime Model for Strategic Space Theory," *Naval War College*, <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA421953> (accessed October 21, 2013). The physics of orbital mechanics do not facilitate the ease of maneuverability accommodated by forces of buoyancy in the maritime domain. In the maritime domain, the low compressibility of water aids in countering Earth's gravitational influence, while orbital mechanics depends on sustained momentum to perpetuate a balance between falling back to Earth and being propelled into space. The energy required to change orbits in space is enormous, especially considering the lack of available resources to sustain propulsion in space.

⁷² Airpower theory aligns better with Sun Tzu's theory of warfare than with the Clausewitzian approach and that alignment has increased over time.

⁷³ Space theory is limited in practice by international prohibitions on the weaponization of space; however, demonstrated Chinese anti-satellite capability hints that space theory needs to be thinking about the implications of future weaponization. As the newest domain, Cyber theory is still in its infancy. It is very likely that space and cyber theory will develop outside of public view.

⁷⁴ Robert D. Kaplan, *The Revenge of Geography: What the Map Tells Us About Coming Conflicts and the Battle against Fate* (New York: Random House, 2012).

⁷⁵ Charles Griffith, *The Quest: Haywood Hansell and American Strategic Bombing in World War II* (Maxwell Air Force Base, AL: Air University Press, 1999), 6.

⁷⁶ Giulio Douhet, *The Command of the Air*, ed. Joseph Patrick Harahan and Richard H. Kohn, trans. Dino Ferrari (Tuscaloosa: University of Alabama Press, 2009), 119. Giulio Douhet was one of the first airpower theorists, and his book, *The Command of the Air*, may have derived its title from Julian Corbett's concept of "command of the sea."

⁷⁷ Ibid., 117-119. Douhet conceded to two variants only if an amphibian version proved impractical because he foresaw the need to project airpower from both land and sea. Although the battleplane was not the only type of aircraft Douhet envisioned, he seemed to distinguish it from other aircraft, which he apparently viewed as “non-operational.” These “non-operational” types of aircraft included reconnaissance aircraft and armed air cruisers.

⁷⁸ Griffith, *The Quest*, 77. Griffith’s book also highlights that engineers advised members of the ACTS that it was impossible to design a fighter with the range to escort long-range bombers. However, aeronautical science and innovation eventually allowed the design of the P-51 Mustang with drop-tanks that could escort bombers into Germany.

⁷⁹ Keith Middlemas and John Barnes, *Baldwin; a Biography* (New York: Macmillan, 1970), 735. British Prime Minister Stanley Baldwin is the source of the well-known phrase: “the bomber will always get through.” The statement was part of an address to the British Parliament in 1932 entitled “A Fear for the Future.”

⁸⁰ Griffith, *The Quest*, 77, 163-164. Griffith noted that “the winds often reached 200 knots over the targets, causing the bombers to drift 45 degrees, but the bomb sights could correct for only 35 degrees. To further complicate matters, winds at lower altitudes often changed in direction and velocity, forcing the bombardier to make any number of corrections.”

⁸¹ Early theory attempted to fit airpower into existing doctrinal concepts instead of recognizing that disruptive technologies generally fail to meet their potential while captive to pre-existing value models.

⁸² Clayton M. Christensen, *The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business* (New York: Collins Business Essentials, 2005), 259.

⁸³ Andrew A. Hill, "The Shock of the New: Innovation in Military Organizations," (Carlisle Barracks, PA: U.S. Army War College, 2013), 3.

⁸⁴ The Defense Advanced Research Projects Agency (DARPA) is well known for developing technologies that commercial research may otherwise have considered too risky to pursue. DARPA is willing to take high risks because they recognize the exceptional strategic payoff that these investments can create for the nation’s national security. In addition, the “Motley Fool Rule Breakers” newsletter is an investment tool that attempts to identify companies with tremendous growth potential due to disruptive technologies.

⁸⁵ The submarine is another classic disruptive technology that was developed out of necessity by the Germans between World War I and World War II.

⁸⁶ James J. Cooke, *Billy Mitchell* (Boulder, CO: Lynne Rienner, 2002), 278.

⁸⁷ Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (Boston: Little, Brown and Company, 2002), 445.

⁸⁸ Franklin C. Spinney, "Genghis John: An Architect of Victory in Desert Storm Is Remembered," *Proceedings - United States Naval Institute* 123, no. 7 (1997): 42-47. Within the U.S. Air Force, Boyd had earned nicknames such as Genghis John, The Mad Major, and The Ghetto Colonel.

⁸⁹ Coram, *Boyd*, 445. Familiarity with Boyd's work was not helped by the fact that he was an Airman discarding Clausewitz's theory of warfare at a time when the Army was in the middle of reinvigorating professional military education that embraced *On War* in the years following the Vietnam War. However, the Marine Corps fully embraced his theory.

⁹⁰ Grant M. Martin, "The Sublime: The Paradox of the 7th Warfighting Function," *Small Wars Journal*, November 25, 2013, <http://smallwarsjournal.com/jrnl/art/the-sublime-the-paradox-of-the-7th-warfighting-function> (accessed February 3, 2014).

⁹¹ The U.S. Army's Warfighting Functions are similar to, and no doubt the origin of, the Joint Functions listed in Joint Doctrine. The Army's Warfighting Functions are currently: Mission Command, Movement and Maneuver, Intelligence, Fires, Sustainment, and Protection. The only variance with the Joint Functions is that the Army has recently decided to change one of their functions from "Command and Control" to "Mission Command," which just seems to express their preference to promote a command philosophy that emphasizes decentralized control. The Army proposal to make "Influence" the seventh warfighting function confuses an important point. Influence is not a function of warfighting; it is the purpose of warfighting. There are certainly other ways to influence people, but it is difficult to imagine what other reason humanity would have for waging war. For more information on the Army's warfighting functions, see U.S. Department of the Army, *Unified Land Operations*, 3-2.

⁹² This is the fundamental premise behind a concept known as Effects Based Operations (EBO). As Edward Smith notes in his book, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War*: "The broad utility of effects-based operations grows from the fact that they are focused on actions and their link to behavior, on stimulus and response, rather than on targets and damage infliction. They are applicable not only to traditional warfare, but also to military operations short of combat. Effects-based operations are not new. Good generals and statesmen have always focused on outcomes and on the human dimension of war (e.g. will and shock). Indeed, we can trace how the principles of effects-based operations have functioned in hundreds of crises and conflicts to distill a straightforward definition: Effects-based operations are coordinated sets of actions directed at shaping behavior of friends, foes, and neutrals in peace, crisis, and war." Edward Allen Smith, *Effects Based Operations: Applying Network Centric Warfare to Peace, Crisis, and War* (Washington DC: Command and Control Research Program, 2002), xiv.

⁹³ Coram, *Boyd*, 103.

⁹⁴ *Ibid.*, 123-134. Boyd's EM Diagrams revolutionized the understanding of aerial combat and allowed the still rambunctious Major Boyd to convince the Pentagon that it needed to scrap its replacement plans for the F-111 and F-4. Boyd then played a significant role in the development of the A-10. Many people refer to Boyd as the father of the F-15 and F-16. *Ibid.*, 5-8.

⁹⁵ Previously, aircraft designs centered around speed and power. Boyd's revelation was that energy was the key factor in aerial combat. *Ibid.*, 132.

⁹⁶ Grant Tedrick Hammond, *The Mind of War: John Boyd and American Security* (Washington DC: Smithsonian Institution Press, 2001), 151-154.

⁹⁷ Ibid., 154. Americans won World War II because of their ability to produce sufficient numbers of soldiers, sailors, airmen, marines, and equipment to overwhelm the Axis powers, and it ended with the U.S. as the only atomic power. However, that preeminence did not last long and soon the world found itself in the midst of a Cold War. Boyd was one of a few strategic thinkers recognizing that the Cold War demanded a completely different mindset, and he became a key figure in urging a shift from attrition-based warfare to maneuver warfare. Boyd played a significant role in developing a well-trained and integrated high-tech Western military that emphasized flexibility, innovation, and adaptability as a balance against numerically superior Soviet military forces, and his influence lasted well after his retirement in 1975.

⁹⁸ Coram, *Boyd*, 328.

⁹⁹ Boyd, "Patterns of Conflict."

¹⁰⁰ Ibid., 38.

¹⁰¹ Ibid., 48.

¹⁰² Coram, *Boyd*, 378-379, 444. On page 444, Coram cites a May 6, 1991 *U.S. News & World Report* article crediting three men with the innovative tactics that won the Gulf War: John Boyd, Mike Wyly, and Huba Wass de Czege. Huba Wass de Czege has continued to be an intellectual force for a concept this author refers to as "intellectual maneuver." Wass de Czege worked extensively with Shimon Naveh to introduce "Design" to the U.S. military (Design and Naveh are discussed later in this paper). On page 378, Coram also provides an interesting phone dialogue describing the first interaction between Boyd and Wyly, who was an instructor at the Marine Corps Amphibious Warfare School. The dialogue helps paint a picture of Boyd's personality: Wyly, "I hear you have a theory about warfare." Boyd, "It's not a theory. It's a briefing. I call it 'Patterns of Conflict.' It's five hours long." Wyly, "My class has only two hours." Boyd, "I can't do it in two. It takes five hours." Wyly, "We don't have five hours." Boyd, "Then you get zero." Wyle eventually relented. Coram also relates a similar situation when the Chief of Naval Operations (CNO) and Chief of Staff of the Army (CSA) expressed interest in hearing Boyd's presentation. Boyd told their offices he needed 5 to 6 hours to provide the presentation; however, when he was told that the generals only had an hour available, Boyd responded "Since your boss is so pressed for time, here's an idea that will save him a lot of time: how about no brief?" before hanging up on the CNO's executive officer. Ibid., 329-330.

¹⁰³ Ibid., 355, 384.

¹⁰⁴ Ibid., 424.

¹⁰⁵ "Col. John Boyd," *Congressional Record* 143, no. 37 (1997).

¹⁰⁶ Boyd, "Patterns of Conflict," 184. The concepts behind Boyd's "Mind-Time-Space" schema are essentially the same points being made today in the push for decentralized execution and mission-type orders to encourage initiative.

¹⁰⁷ Boyd, "Destruction and Creation."

¹⁰⁸ John Boyd, "Conceptual Spiral Presentation by John Boyd 1," *YouTube*, http://www.youtube.com/watch?v=U_fjaqAiOmc (accessed December 23, 2013).

¹⁰⁹ Boyd, "Destruction and Creation."

¹¹⁰ Boyd, "Conceptual Spiral Presentation by John Boyd 1."

¹¹¹ John F. Schmitt, "A Systemic Concept for Operational Design," http://www.au.af.mil/au/awc/awcgate/usmc/mcwl_schmitt_op_design.pdf (accessed December 19, 2013), 3.

¹¹² U.S. Department of the Army, *Commander's Appreciation and Campaign Design*, TRADOC Pamphlet 525-5-500 (Washington DC: U.S. Department of the Army, 2008), 17.

¹¹³ T. O. Jacobs, *Strategic Leadership: The Competitive Edge* (Washington DC: National Defense University, 2008).

¹¹⁴ John Boyd, "Colonel John Boyd," *YouTube*, <http://www.youtube.com/watch?v=Rbb48uUOkqQ> (accessed December 23, 2013).

¹¹⁵ This conclusion is based on this author's discussions with Shimon Naveh at the U.S. Army's School of Advanced Military Studies (SAMS) during the period between Fall 2006 and Spring 2007.

¹¹⁶ John A. Warden III, "The Enemy as a System," *Airpower Journal* 9, no. 1 (Spring 1995). Warden's 1988 paper from the National War College was entitled "The Air Campaign: Planning for Combat" and espoused a more Clausewitzian view of warfare focused on the singular perspective of a Center of Gravity and decisive action. In Warden's writing, he continued to reference Clausewitz, while espousing concepts that seem more aligned with Sun Tzu. It is interesting to wonder whether his views morphed as a result of planning for Operation Desert Storm, or if they had already begun as a result of his studies at the National War College. It would also be interesting to know how much exposure to Sun Tzu's *The Art of War* Warden received through professional military education; he clearly had been exposed to Clausewitz's theory *On War*.

¹¹⁷ About a year later, while a professor at the U.S. Marine Corps War College, Joseph Strange expressed a similar concept of focusing on vulnerabilities. Like Warden, Strange tends to view the enemy as having a multitude of vulnerabilities instead of becoming focused on a single center of gravity. These approaches get to the "so what" of adversarial analysis and tend to make them more practical to the strategist and planner. For more information on Strange's work, see Joseph Strange, *Centers of Gravity & Critical Vulnerabilities: Building on the Clausewitzian Foundation So That We Can All Speak the Same Language* (Ft. Belvoir: Defense Technical Information Center, 1996); Strange and Iron, "Understanding Centers of Gravity and Critical Vulnerabilities."

¹¹⁸ Warden III.

¹¹⁹ Ibid.

¹²⁰ Ibid.

¹²¹ Another key advantage of parallel warfare is that it allows greater opportunity to observe how the enemy system reacts to various actions, and it facilitates learning that would not be achievable if only focused on a single center of gravity.

¹²² The title of Warden's paper is "The Enemy as a System," and Cybernetics is the study of systems (mechanical, physical, biological, social, etc.). This author found significant similarity between Systems Theory and the French philosopher Gilles Deleuze's Assemblage Theory. Deleuze's thoughts may also have been an influence on Shimon Naveh. For more information on Assemblage Theory, see Manuel De Landa, *A New Philosophy of Society: Assemblage Theory and Social Complexity* (London: Continuum, 2006).

¹²³ Yotam Feldman, "Dr. Naveh, or, How I Learned to Stop Worrying and Walk through Walls," *Haaretz*, October 25, 2007, <http://www.haaretz.com/weekend/magazine/dr-naveh-or-how-i-learned-to-stop-worrying-and-walk-through-walls-1.231912> (accessed February 4, 2014).

¹²⁴ Eyal Weizman, "Lethal Theory," [http://www.skor.nl/_files/Files/OPEN18_P80-99\(1\).pdf](http://www.skor.nl/_files/Files/OPEN18_P80-99(1).pdf) (accessed February 13, 2014).

¹²⁵ Shimon Naveh, "Systemic Operational Design: Transforming the Triad, Extending the Potential," <http://www.slideshare.net/ubiwar/shimon-naveh-powerpoint> (accessed December 20, 2013). Naveh's work offers important practical insights and proffers three lenses through which one should view the world when trying to transition from "system framing" to "operational framing." These three lenses include viewing the Rival as Rationale, Logistics as Rationale, and Command as Rationale for the ensuing strategy (or design, if one considers the word as a noun).

¹²⁶ John Schmitt and William Young wrote early papers on design that this author found useful. Additionally, although Alex Ryan joined the Army's School of Advanced Military Studies (SAMS) after the school had been exploring designs for a couple years, his academic background in Complexity Theory allowed him to quickly contribute to the intellectual development of Naveh's concepts and he has provided many coherent thoughts on design.

¹²⁷ Some in the military seem to use Design both as a verb and as a noun.

¹²⁸ John Boyd would describe this common/shared understanding as a "mind-time-space schema." For more information, see Boyd, "Patterns of Conflict," 74.

¹²⁹ This concept is similar to this paper's earlier discussion about Clausewitz's belief that a commander-in-chief must function as both a statesman and a general, balancing political "ends" with available "means."

¹³⁰ The Ends, Ways, Means framework is a recent construct of concepts expressed by Clausewitz in *On War*. Clausewitz spoke in terms of Ends and Means, but he clearly expressed and understanding of the importance of planning on how to link the two. Clausewitz also acknowledged this is not a novel or erudite idea: "No one starts a war—or rather, no one in his senses ought to do so—without first being clear in his mind what he intends to achieve by that war and how he intends to conduct it." Clausewitz, *On War*, 579. However, Clausewitz firmly believed that Ends are tied to political objectives, and he describes the How, or Way, as the operational objectives. In a general sense, one can think of a higher headquarters (HHQs)

Ways as establishing the objectives for subordinates, thus maintaining linkage between strategies at various levels

¹³¹ Based on this author's discussions with Shimon Naveh at the U.S. Army's School of Advanced Military Studies (SAMS) during the period between Fall 2006 and Spring 2007.

¹³² The author of this paper draws this conclusion from years of inquiry with graduates of various U.S. military staff and war colleges. USMC officers seem to have a much deeper appreciation for Boyd's contribution to the corpus of warfare theory than any other service, including the Air Force. Robert Coram's book, *Boyd: The Fighter Pilot Who Changed the Art of War*, helped this author understand the strong association between John Boyd and the USMC. As a graduate of the Air Force Squadron Officer School, Air Command and General Staff College (ACSC), Air Force Institute of Technology, Army School of Advanced Military Studies (SAMS), Air War College (AWC), Joint Combined Warfighting School (JCWS), and a current student at the Army War College (USAWC), the author has experienced very little formal exposure to John Boyd's work. Nevertheless, while studying Naveh's theory of Systemic Operational Design there was a nagging suspicion and curiosity that led to further exploration of Boyd's work.

¹³³ Ketti C. Davison, *Systemic Operational Design (SOD): Gaining and Maintaining the Cognitive Initiative*, SAMS Monograph (Fort Leavenworth, KS: US Army Command and General Staff College, May 25, 2006), 15.; William T. Sorrells and others, *Systemic Operational Design: An Introduction*, SAMS Monograph (Fort Leavenworth, KS: US Army Command and General Staff College, 2005), 10-11.

¹³⁴ The legal authority of command will remain an important aspect of military service, but initiative is less likely to stem from legalistic motivations than from a sense of teamwork that revolves around trust, confidence, and a shared goal. Trust and confidence are crucial and must be bi-directional within an organization, but they are also crucial factors in facilitating unity of effort amongst organizations that have no formal command relationship. Hence, trust and confidence can have vertical and horizontal aspects. General (Retired) Gary Luck is found of the phrase "the speed of trust", which he borrows from a book of the same title by Stephen M.R. Covey. In a paper on the insights and best practices of joint operations, Luck says "we see successful commanders building personal relationships, inspiring trust and confidence, leveraging the analytical ability of their staffs, prioritizing limited resources, and decentralizing to the lowest appropriate level capable of integrating assets to empower their subordinates. However, we continue to see a tendency among commanders to control subordinates to a point where they unintentionally compromise the unit's agility and speed." Gary E. Luck and Mike Findlay, *Joint Operations: Insights and Best Practices*, 3rd ed. (Norfolk, VA: United States Joint Forces Command, 2011), 3; Stephen M. R. Covey and Rebecca R. Merrill, *The Speed of Trust: The One Thing That Changes Everything* (London: Pocket Books, 2008).

¹³⁵ Clausewitz, *On War*, 63.

