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FUTURE WAR PAPER

Reconstructing Operational Theory: A Framework for Emerging Threats in a Complex Environment

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EXECUTIVE SUMMARY

Title: Reconstructing Operational Theory: A Framework for Emerging Threats in a Complex Environment

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Thesis: A new operational theory is required to provide a conceptual framework for achieving strategic objectives against emerging insurgent threats in an increasingly complex urban environment.

Discussion: Desert Storm and Operation Iraqi Freedom (OIF) stand as the zenith of the United States' operational theory for combined arms maneuver resulting from AirLand Battle and maneuver warfare. During the interim ten years between these conflicts, proponents of the Revolution in Military Affairs (RMA) and the Transformation process postulated that advanced technologies would achieve "precision engagement," "dominant maneuver," "Persistent ISR," and even "Global Strike." The drive to Baghdad confirmed this hubris while the experiences of Mogadishu, Somalia, Grozny, and other indicators of a changing tide went unheeded. However, the combination of these experiences taught potential adversaries the need for mechanisms to mitigate U.S. military dominance. Conventional enemy forces, terrorists, and both state and non-state sponsored insurgent groups recognize the futility of open-confrontation with U.S. military forces. From Lebanon to Al-Anbar province, weaker foes enabled by the information age and weapons proliferation see the urban environment as the great leveling mechanism to enable their cause. Al Qaida, Hezbollah, and others understand that tactical integration with the urban environment and "hugging" the civilian populace minimizes their opponent's advantages of Intelligence-Surveillance-Target Acquisition-Reconnaissance (ISTAR), mass, and firepower while increasing their operational complexity. These urban advantages promote protection and concealment for weaker groups and allow them to harness the domain of information operations and propaganda. Concurrently, global population trends show near-exponential growth and increasing urbanization that will include 50% of the world's populace by 2008. This combination of growing insurgent or irregular activity intertwined with an increasingly complex urban world reflects an operational problem vastly different from the post-Vietnam global environment. A new operational theory is required to provide a conceptual framework for achieving strategic objectives against emerging insurgent threats in an increasingly complex urban environment.

Conclusion: Successful development and evolution of a new operational theory to address the emerging military problem requires a broad intellectual debate that includes civilian and military participation, application of scientific and inter-disciplinary theory, and strategic military leadership. From this process, a new operating paradigm will likely evolve for the future that breaks the technology-centric approach that drives the existing Joint doctrine and concepts development. A new operational framework and theory for future conflict will ensure DOD avoids the "idealization of tactics" that yields unfocused concepts, erodes future warfighting capabilities, and wastes vast resources.

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PREFACE

At the conclusion of the Vietnam War, the United States' military focused on the increasing Soviet menace. Theoretical and doctrinal efforts ignored the recent lessons of counterinsurgency in favor of a mechanized, firepower-centric conventional doctrine. General William E. Dupuy, the Training and Doctrine (TRADOC) Commandant, directed the formulation of the 1976 Active Defense field manual to focus cognitive efforts towards a new strategic reality characterized by a conceptual gap between recent Vietnam experiences and perceived future environments dominated by armored maneuver.[1] These efforts failed to produce a viable operational theory to the existing Soviet threat, but did initiate an intellectual debate where none existed and fueled historic changes ahead. A rededication to the perceived strategic and operational problem in Europe served as the catalyst for ten years of innovation culminating in a major paradigm shift in operational theory.

General Donn Starry replaced General Dupuy at TRADOC after commanding the V Corps, where he tested and challenged the precepts of the Active Defense doctrine as a corps-level operational commander. The lessons and perceptions he developed resulted in the tentative concept of Central Battle and influenced his leadership of an intellectual nucleus at TRADOC that included Lieutenant General William R. Richardson, Lieutenant Colonel Huba Wass de Czege, and Lieutenant Colonel L.D. Holder. These individuals developed the evolving concepts of Integrated Battle, and Extended Battle that challenged the foundation of Active Defense. This work also introduced systemic thinking and previously unrecognized tensions between tactical actions and operational conception.[2]

Civilian integration and broad Army/military review complimented the internal efforts of Generals Dupuy and Starry. Both recognized the importance of including civilian intellectuals

from a broad range of fields. William Lind, John Boyd, Steven Canby and others provided valuable insights to the theoretical debate as well as posing counterarguments unconstrained by career repercussions.[3] Additionally, General Starry recognized the importance of broad institutional input into the developed drafts of the 1982 AirLand Battle and instigated widespread circulation to receive feedback and promote institutional acceptance. This dialectic synthesis produced the 1982 and 1986 versions of FM 100-5 AirLand Battle that established operational art as "the employment of military forces to attain strategic goals in a theater of war or a theater of operations through design, organization and conduct of campaigns and major operations." [4] This established the operational context as the cognitive connection between abstract strategic aims and the tactical means required to achieve them.

Concurrently, the Marine Corps' development of Maneuver Warfare doctrine exemplified many of the same processes, intellectual debate, civilian participation, and individual leadership of a visionary operational-level leader in General Alfred M. Gray. In 1991, Desert Storm affirmed these theories through the operational conceptualization of strategic aims and translation of this understanding into unparalleled tactical action. Desert Storm radically altered perceptions of mechanized, combined arms maneuver and demonstrated the United States' unparalleled capability in this realm. Unfortunately, this success resulted in theoretical stagnation at home while our potential adversaries rapidly evolved to meet the challenge of hegemonic military might.

> "The fact that most contemporary military operations are staged in cities suggests an urgent need to reflect on an emergent relationship between armed conflicts and the built environment. Contemporary urban warfare plays itself out within a constructed, real or imaginary architecture, and through the destruction, construction, reorganization, and subversion of space. As such, the urban environment is increasingly understood by military thinkers not simply as the backdrop for conflict, nor as its mere consequence, but as a dynamic field locked in a feedback-based relationship with the diverse forces operating within it-local populations, soldiers, guerrilla fighters, journalists and photographers, and humanitarian agents."[5]

A CHANGING LANDSCAPE

Desert Storm and Operation Iraqi Freedom (OIF) stand as the zenith of the United States' operational theory for combined arms maneuver resulting from AirLand Battle and maneuver warfare. During the interim ten years between these conflicts, proponents of the Revolution in Military Affairs (RMA) and the Transformation process postulated that advanced technologies would achieve "precision engagement," "dominant maneuver," "Persistent ISR," and even "Global Strike." The drive to Baghdad confirmed this hubris while the experiences of Mogadishu, Somalia, Grozny, and other indicators of a changing tide went unheeded. However, the combination of these experiences taught potential adversaries the need for mechanisms to mitigate U.S. military dominance. Conventional enemy forces, terrorists, and both state and non-state sponsored insurgent groups recognize the futility of open-confrontation with U.S. military forces. From Lebanon to Al-Anbar province, weaker foes enabled by the information age and weapons proliferation see the urban environment as the great leveling mechanism to enable their cause. Al Qaida, Hezbollah, and others understand that tactical integration with the urban environment and "hugging" the civilian populace minimizes their opponent's advantages of Intelligence-Surveillance-Target Acquisition-Reconnaissance (ISTAR), mass, and firepower while increasing their operational complexity. These urban advantages promote protection and concealment for weaker groups and allow them to harness the domain of information operations and propaganda.

Concurrently, global population trends show near-exponential growth and increasing urbanization that will include 50% of the world's populace by 2008. (See Appendix 1). This combination of growing insurgent or irregular activity intertwined with an increasingly complex urban world reflects an operational problem vastly different from the post-Vietnam global environment. A new operational theory is required to provide a conceptual framework for achieving strategic objectives against emerging insurgent threats in an increasingly complex urban environment. [6]

This paper will address the need for a new operational theory by first discussing the definition and purpose of operational theory. Examples will elucidate the role of theory throughout modern conflicts and examine four major shortfalls in current Joint concepts and doctrine to provide a contemporary point of comparison. Then, a historical perspective on urban combat and insurgencies will frame whether the emerging operational environment poses a new dilemma or is merely a re-emergence of past characteristics. Thirdly, it will propose the foundation for a new operational theory through presentation of cognitive lenses to better frame the characteristics of the emerging problem. This foundation will examine the urban environment and insurgency through systemic, ontological, and theoretical approaches and further introduce other related fields of inquiry relevant to this study. Finally, it will postulate the central idea of Operational Shock and other broad elements as the basis for future operational theory. In doing so, this study proffers one operational theory to address an emerging operational environment characterized by conventional war, insurgent activity and urbanization.

OPERATIONAL THEORY IN PRACTICE

Definition and Roles. No formal definition exists in military doctrine for operational theory. Different sources provide varying descriptions while JP 1-02 does not contain a definition for either operational theory or operating concepts. The exact definition may prove nebulous but its understanding and utilization by great military figures throughout history is deep and meaningful.

Napoleon, Moltke, Grant, Tukhachevskii, and others understood the strategic context of their time, the existing military problem, available resources, and countless other dimensions while developing and implementing revolutionary operational theories. Operational theory informs military thinking without being overly prescriptive or immediately utilitarian.[7] It provides a framework, conception, and mental model of war that illuminates solutions to existing military problems. Clausewitz postulated three roles for theory: the cognitive providing an analytical framework for improved understanding of war; the utilitarian or more directly related to execution; and the pedagogic role or the creative and educative processes that emerge from the actual creation of theory.[8] Arguably, the cognitive and pedagogic roles are the most valuable application for operational theory and the most needed today.

Four Shortfalls of Existing Theory. After Desert Storm, the U.S. approach to operational theory increasingly distorted the meaning and role of operational theory or operating concepts. Enraptured with the success of the 100-hour war in Iraq, joint and service proponents layered ideas and concepts onto existing operational theory to "better leverage" technology and the nation's industrial prowess.

> This resulted in "umbrella concepts, functional concepts, capstone concepts, overarching concepts, and integrating concepts. They are typically functional categorizations, useful for listing dimensions of the problem but virtually worthless in actually solving the problem. For over a decade there has been too much word processing and PowerPoint slide building, accompanied by far too little thinking and real debate. We have an irrepressible penchant to declare intellectual categorizations and invoke terminology, all blissfully unconstrained by the rigors of definition or potential utility."[9]

Today, the growing combination of Joint Operating Concepts, service doctrine, and integrating/functional concepts fails to produce an accurate and enriching description of the emerging military problem and disjointed framework of military theory and warfighting approaches. (See Appendix 2)

In addition to the lack of coherence across the central ideas of each existing Joint concept, these documents fall short of understanding the existing operating environment. Close scrutiny yields only a superficial, terrain-oriented appreciation for urban operations similar to mountains, jungle, and desert warfare. The 2006 Quadrennial Defense Review mentions "urban" three times in the entire document (twice in photo captions).[10] The April 2007 addition of the Irregular Warfare Joint Operating Concept fails to discuss the specter of insurgents, guerrillas, and terrorists operating in the urban environment completely.[11] This deficiency undermines the value of these products and indicates a lack of understanding of the inextricable relationship between future threats and the operating environment.

Another reason for the failure to frame correctly the future operating environment is the lack of theoretical basis in most of the existing joint concepts. Work by John Boyd, Marine Corps Combat Development Command under Lieutenant General Van Riper, Andrew Ilachinski, Shimon Naveh and others exposed the realm of "new sciences" and the resulting increase in understanding of potential military problems.[12] Thomas Kuhn illustrates the potential gained in understanding existing problems through exposure to previously unknown fields or advancements in his seminal work The Structure of Scientific Revolution. His concept of a paradigm shift, best illustrated by the change from the Ptolemaic system to the Copernican system, demonstrates the scale and potential of revolutionary shifts in human understanding.[13] The new sciences offer military theory similar potential in understanding the global environment today. Few existing publications include the new sciences or attempt a holistic and systemic approach. Those that do, such as JP 3-06, Doctrine for Joint Operations, incorporate terminology or "bumper stickers" without adequately developing the scientific theory or achieving a higher degree of efficacy.[14]

As stated earlier, operational theory and concepts by definition reside at the operational-level of war. The fourth area of friction for existing theory and doctrine is the increasing tactical

focus within the services and military-industrial complex. Technological advancements including weapons, communications, vehicles, aircraft, and wargaming play a vital role in the preparedness and enhancement of military capabilities but focus on the tactical aspects of future conflict without recognizing and developing a broader operational framework. In some cases, these tactical initiatives rise from a growing cognitive dissonance between emerging threats and existing operational theory. The Marine Corps' Distributed Operations, a novel tactical concept, is an evolutionary outgrowth of the described emerging threats in absence of an overarching theoretical framework to drive future development, employment, and evolution.[15] The absence of strategic-operational recognition of emerging threats, and attempts to tailor traditional industrial-based maneuver doctrine to meet poorly conceived threats, represents a dangerous idealization of tactics.[16] Recent publication of the Army/Marine Corps FM 23-4 Counterinsurgency Manual and the developing Joint Urban Operating Concept are superb examples of doctrinal products that employ a sound conceptual basis and accurate description of the emerging operating environment albeit at a level below operational theory. In fact, an overarching operational theory would provide the framework for a greater outgrowth of similar joint doctrine and concepts.

THE HISTORICAL POINT OF DEPARTURE

Many case studies of urban conflict and insurgency illustrate the form and character of the emerging operational environment. (See Appendix 3 and 4) Urban conflicts and insurgencies occurring after the industrial revolution are most pertinent to this study and the development of future theory and concepts.[17] Historically, military forces consider three major reasons for attacking an urban center or investing an enemy city including political or psychological significance to either side; geographical location or proximity to lines of operation; and importance to the people or larger global community.[18] Based upon these reasons, forces then determine the character of the conflict by their strategy, campaign design and application of

forces. These factors generally result in battles/campaigns characterized by annihilation or attrition/erosion.[19] Warsaw, Stalingrad, and Berlin during World War II (WWII) exemplify battles of annihilation. Mogadishu, Somali and Lebanon 2006 best fit the strategic model of attrition/erosion in which the U.S. and Israel sought limited objectives respectively.

The U.S. traditional approaches to urban operations evolved since WWII, from annihilation by combat power, to an isolate and bypass methodology, to the more recent contemplation of a "precision strike" approach.[20] Historical urban conflicts normally involved uniformed opponents segregated from the civilian populace through isolation or displacement of non-combatants. Fallujah is the most recent example of this approach. However, U.S. operations in Mogadishu more accurately capture the essence of future urban conflict. We cannot count on the luxury of fighting an insurgent force in a vacated urban setting, like Fallujah, as the basis for conceptual and doctrinal development. Media presence and density of civilian population and infrastructures precludes the use of indiscriminate force and mass collateral damage. If, hypothetically, indiscriminate force and collateral damage are not limiting factors in future battles, the enemy's ability to learn and adapt from the examples discussed in this paper still present the same problem. Hezbollah tactics and capabilities in Lebanon during 2006 exemplify an evolved and adaptive capability that stymied a traditional combined-arms maneuver force.[21]

Somalia, Grozny, Nablus, Lebanon, and Iraq are all recent examples of insurgent tactics that indicate a trend towards future threats. While urban warfare, insurgency, and even urban insurgency are not new phenomena, the accelerated evolution and adaptability of threat forces combined with increasing urbanization presents unique challenges.[22] John Boyd described the essence of guerrilla/insurgent threats as:

> "Ability to continuously demonstrate government weakness, erode government influence, and cause government to alienate itself from people. Support of people (both psychological and physical) for intelligence, recruits, shelter, transportation, refuge, food, money, and medical aid. Access to (more or less permanent) safe

> sanctuaries or base areas and/or fluid bases that can be shifted from place to place, away from enemy forces—in order to rest, recuperate, repair material, etc., as well as indoctrinate, train, and equip recruits."[23]

This essence distills the inherent advantages densely populated areas and urban enclaves provide for sanctuary and support. The example of Maoist rural sanctuaries is increasingly irrelevant due to population growth, urbanization, and the dependence of insurgents on built-up areas. Furthermore, operating away from urban centers allows the U.S. and other modern powers to employ the full range of their ISTAR and kinetic capabilities with less concern for collateral damage and damaging propaganda.

TOWARDS AN OPERATIONAL THEORY

The Emerging Operational Environment-Three lenses for defining the problem.

Understanding an emerging operational problem requires a broad cognitive approach at the operational level to conceptualize and provide a theoretical basis for a future solution. It is beneficial to formulate three distinct mental lenses through which to analyze the emergence and understand such a complex subject. This paper will propose three lenses that are equally applicable to the future urban environment and both future conventional and insurgent enemy threats.[24] The first filter proposed is a systemic approach to complex environments and organisms. The urban environment is a structurally and interactively complex system with dynamic relationships between the population and urban sub-processes that comprise this open system. These characteristics are applicable to both enemy military systems and insurgency equally.[25] The second relevant lens is the ontological perspective or understanding enemy threats, urban density, growth patterns and city plans as they actually exist. There should be considerable overlap between these first two lenses because of the acceptance and understanding that complex adaptive systems accurately portray the real environment vice merely serving as an analogy. Finally, the third lens that illuminates the emerging military problem is the application of existing

theory including cognitive psychology, cultural anthropology, urban design and architectural theory to expand existing methods of interpreting both the urban and enemy systems.

Systemic Approach to the Operating Environment. The urban environment is an open, structurally and interactively complex system characterized by the non-linear interaction of its subordinate elements and processes.[26] As complex adaptive systems, urban centers readily exchange and facilitate the flow of energy, people, money, fuel, information and countless other elements both internally/locally, regionally, and globally. Cities demonstrate both hierarchical order as well as self-organizing characteristics that reflect human-based processes and enable the city to function. As population growth and burgeoning urban development marked the last half of the 20th century, the advent of the automobile, information age, and other technological advancements compelled fundamental shifts in the urban environment's characteristics. Cities and their resident populations spread beyond city boundaries creating large suburban complexes and smaller satellite towns. [27] The ensuing network of urban centers creates regional symbiotic relationships and interdependence between adjacent cities and towns, while increasing the flow of resources, people, energy, and information.[28] The result of the interactions between subordinate elements and processes within each city and its adjacent network of regional urban centers is a dense, interactive flow of matter, energy, and information in a highly complex and sophisticated system that is both highly sensitive to perturbations but also highly adaptable.[29] John Schmitt explains the essence of regionalism in that a city's membership within a larger regional urban framework is actually best characterized by multiple, overlapping interacting regions based on functional processes. Particular cities connect economically while several others interact based upon political, ethnic, or administrative boundaries.[30] Ethnic, religious, and cultural boundaries or regions may prove most significant to military planners during future urban conflict, particularly in lesser-developed countries.

In considering the urban environment as a complex adaptive system, it is best to consider it as a living system with structure and processes.[31] General Donn A. Starry employed James Grier Miller's theory of living organisms to describe cities as living systems that display common functional characteristics. "Understanding the framework of functional systems then provides a parametric baseline for tactical operations against villages and towns and for operational-or strategic-level attacks against large cities."[32] John Schmitt further expounds on the concept of Miller's Living System by explaining that combatants generally define their perspective within the city in relation to their opponent. Conversely, the city demonstrates independent behavior based on its individual interests, survival or otherwise, and reacts to the interjected combat with indeterminate emergent behavior.[33] Although this emergent behavior is not planned or designed, military planners who understand the characteristics and subsystems of the urban living system are better enabled to anticipate and adapt to its appearance. (See Appendix 5 for depiction of Miller's Living System. See Appendix 6 for example of subsystems within an urban living system according to John Schmitt)

The Ontological Perspective. General James T. Conway's "Commandant's Planning Guidance" calls attention to the "Arc of Instability" that signifies the global region composed of rapidly growing but unstable, lesser-developed countries.[34] (See Appendix 7) As increasing globalization and urban growth influences future military conflicts, this region possesses the preponderance of the lesser developed nations that pose the greatest potential for instability, subversion, and threat to the United States. Based on 2005-2006 population data, the most rapid urban population growth is found in countries within the "Arc of Instability." By 2015, 60% of the global population will live in urban areas.[35] While lesser-developed countries continue to add urban dwellers, Europe and other stable regions forecast urban population decline or stagnation. This growth in underdeveloped countries, mostly within littoral regions, vastly complicates future

military considerations. Growing economic and social gaps within the "Arc of Instability," fueled by greater information flow, risks increasing animosity and creating potential enemies to the United States and its allies.

Modern urban cities and regions represent increasingly complex environments that can be broken into complex physical terrain, complex human terrain, and complex informational spheres. The first two perspectives clearly overlap with an understanding of cities as complex adaptive or living systems. This recognition is suitable for the physical domain but the complex human terrain requires greater elaboration. Complex human architecture within cities consists of three distinct classifications of hierarchical, multicultural, or tribal.[36] Hierarchical cities are those commonly found in the United States, Europe and other regions that espouse a broadly accepted rule of law. Multicultural cities seem to be hierarchical in nature but religion, custom and other chasms divide actual power. The challenge is for military planners to recognize this multicultural undercurrent before injecting energy into the urban system. In the future, urban areas in Nigeria will epitomize the multicultural phenomena with 180 million people, split 60-40 between Muslim and Christian, living within growing mega cities. Finally, tribal cities are those divided not by religion but blood or ethnicity. Mogadishu, Somalia and Karachi, Pakistan exemplify a growing number of tribal cities that offer refuge to disenfranchised people more closely aligned with a nomadic heritage than the western rule of law.

Finally, the urban system's complex physical and human terrain is increasingly intertwined with complex information spheres that necessitate recognition of the higher-order effects of military actions. Urban density today is an order of magnitude above those of the previous two centuries. Actions that lead to indiscriminate destruction and casualties create a larger military problem in the end. Displaced persons, physical damage, and public opinion are both strategic and operational considerations that result from military action within complex human and physical

terrain. This is only exacerbated by the unimpeded flow of information, news, and video influencing world response.

From this "Human Architecture" defined by Ralph Peters and the recognition of complex physical, human, and informational terrain, it is evident that these three components interacting within the larger urban living system influence and determine its physical dimensions and shape. For example, a hierarchical city in the Middle East such as Cairo will have a vastly different appearance and structure than Shushtar, Iran or Karachi, Pakistan. Recognizing the dynamic relationship between the human and the physical allows the military planner to understand the physical structure better. Merely studying the physical structure alone provides a one-dimensional assessment that may lead to disaster.[37] Middle Eastern cities in particular are vastly different in structure and form from Western cities based on their culture and development. Built around the Old City, these urban centers are characterized by mosques, madrasahs and interior living spaces that remain hidden from the street observer.[38] Similar structural obscuration posed tremendous challenges for U.S. forces in Mogadishu in 1993. Conversely, the IDF's recognition of this hidden space enabled their successful attack on Nablus in 2002. Through understanding the space and its interaction with both combatants and innocent populace, military leaders can plan operations that mitigate unnecessary casualties and destruction.

The Application of Theory-The Boyd Approach. With the understanding of the complex and living urban system and its ontological realties, military planners must also synthesize existing theory in the fields of cultural anthropology, cognitive psychology, urban design, architectural theory, network theory and other fields that potentially influence the development of a new operational theory. Such a broader and enlightened perspective encourages innovative approaches to interpreting human behavior, space and its use, as well as deeper meaning through scientific discovery. For example, traditional military approaches translate urban

space as it actually appears treating streets as streets, alleys as alleys. The normal interpretation recognizes such open spaces as danger areas susceptible to enemy fire while conversely equating closed or confined spaces as being restrictive to maneuver. At surface level, these interpretations are valid but with an understanding of urban design, and architectural theory, the military planner can construct a novel perspective that facilitates the re-conceptualization of urban campaigns or operations.

The first complete attempts to incorporate architectural theory into military operations are attributable to the Operational Theory Research Institute, formerly led by retired IDF Brigadier General Shimon Naveh. While the composition and construction of the urban environment traditionally influence targeting calculus, this is not the same as stimulating the conceptualization of maneuver. Naveh and Brigadier General Aviv Kokhavi designed the 2002 Nablus operation with the heavy influence of architectural theorists and philosophers such as Bernard Tschumi, Gilles Deleuze, and Felix Guattari.[39] Applying Deleuze and Guattari's concept of "the striated and the smooth," the IDF realized the complexity of the Palestinian areas including buildings, streets, ditches, walls, and fences could be "smoothed" to allow the free-flow of maneuver. The operation inverted the geometry of the battlespace turning the open areas into no-go terrain and focusing all maneuver on the seemingly disjointed and obstructed areas. The design of fractal/swarm maneuver infiltrated dozens of small teams into the isolated urban area, and employed maneuver through the interior or inverted space of the city. The IDF forces "smoothed" the striated space by moving through walls from room to room, building to building and remained invisible to outside observers through the aid of external snipers, aerial observation, and magnetic resonance technology.[40]

John Boyd's strategic thinking and theoretical development incorporated a vast array of scientific and philosophical theory to broaden his perspective on the history and conceptualization

of warfare. From the cognitive psychology of Michael Polanyi to Murray Gell-Mann's application of Complexity Theory to business, Boyd's reading and synthesis reflects the importance of studying vastly different but interconnected fields.[41] His impact on the evolution of operational theory exemplifies the importance for broad intellectual development in professional military education.[42]

THE CENTRAL IDEA: OPERATIONAL SHOCK

With the recognition of an emerging military problem, it is logical to assess existing operational theory in developing a future construct. As previously mentioned, the apparent disunity between DOD and individual service doctrines confuses any potential joint approach. The Army's full-spectrum operations, the Marine Corps' Maneuver Warfare, and existing Joint doctrine all provide different operational theories and approaches to warfighting ranging from prescriptive to broad and enduring mindsets. [43] Today's existing theory and doctrine emerged from the mid-1980s to counter the threat of a larger, more powerful opponent. The incorporation of the theories of John Boyd, Sun Tzu, and others formed the basis for an approach that empowered a fundamentally smaller force to attack enemy weaknesses and cause both its physical and cognitive collapse. Today there is no peer or near-peer competitor although any future theory must balance insurgency and conventional conflict anticipating a strong competitor like China. On this basis, a new operational theory should meet both conventional threats and emerging threats that are largely unaffiliated, invisible, decentralized, and smaller in nature.[44] Through synthesizing the theoretical foundations of Maneuver Warfare doctrine, AirLand Battle, the central ideas of existing Joint Doctrine, and the historical example of Soviet Deep Operations Theory, the recommended central idea for a new operational theory is Operational Shock.

Mikhail Tukhachevskii, and several counterparts, developed the Soviet Deep Operations Theory during the late 1920s with its written form evolving in the early 1930s. Tukhachevskii,

A.A. Svechin and V.K. Triandafillov developed this theory as an outgrowth from World War I and the Russian Civil War. Their experiences demonstrated the need for an overarching theory or cognitive approach to directing operations.[45] The operational aim behind this Soviet Theory was "Udar" or Operational Shock. Employing a holistic systemic approach to operational theory, Tukhachevshkii espoused the cognitive disruption of his enemy through simultaneous fragmenting or dividing strikes, exploitation, and deep strikes. This simultaneous action conducted across the depth of the enemy's system provided the framework for an advanced paradigm of operational strike maneuver focused on disrupting the enemy's cognitive and physical responses with Operational Shock.[46] The Soviet Theory represented a departure from traditional linear and attrition-style warfare and arguably provided a deeper understanding to operational maneuver than the tactical and mechanistic Blitzkrieg developed concurrently by the Germans. For this reason and its cognitive/physical aspects, the Soviet Theory provides an interesting historical perspective.

Capturing the cognitive disruption of the enemy system with the elements of simultaneity and depth provides a basis for Operational Shock. This also forms a bridge with other existing doctrine including the concept of high-tempo multi-dimension operations designed to dislocate, destruct, and disintegrate an enemy system.[47] (See Appendix 8) This notion from Major Combat Operations appears valid but careful analysis shows its basis to be the supporting concepts of Net-centric Warfare, Dominant Maneuver, and Space Force application, which are arguably hollow and misinformed ideas. The genesis for the dislocate, destruct, and disintegrate idea is actually the work of Dr. James J. Schneider who advocates the combination of maneuver, attrition and cyber shock to create paralysis, exhaustion, and annihilation in the enemy system.[48](See Appendix 9) This ultimately leads to its disintegration. The parallel logic between this notion and the concept of Operational Shock provide a bridge for future refinement of operational theory. By synthesizing these two approaches with the characteristics of an urban system, several

complimentary requirements surface that are integral and related to simultaneity and depth. The most significant is the successive application of force. The density of the urban environment and disaggregated nature of potential threats requires successive application of force, or influence, temporally-spatially-cognitively, to maintain a paralyzing effect on the enemy system. Conversely, several characteristics that should not define Operational Shock are nodal analysis, critical nodes, and decisive points.[49] While certain geographic points or infrastructure nodes may become important at the tactical maneuver level, these do not rise to the operational level and only introduce a reductionist approach.

ELEMENTS FOR CONSIDERATION IN FUTURE THEORY

The nature of war remains immutable and remains characterized by the fog, friction and chaos described by Clausewitz. The work and characterizations of John Boyd in this arena should be central to future intellectual debate as well.[50] Without question, fighting in the complex environment of a living urban system will require adaptive and new approaches to the application and integration of our military/warfighting functions. Implications across the span of command and control, fire support, logistical sustainment, force protection, and maneuver will be extensive. However, broader elements should commence the intellectual debate, analysis, synthesis, adaptation, and learning that derive from the cognitive and pedagogic roles of theory. Doing so will maintain the appropriate operational-level focus:

Nature of Future Conflict

- The immutable nature of war endures.
- Characterized by increasing civilian Strategic-Military operational tension as conflicts involve more non-state actors and increasingly complex strategic ends. Strategic objectives evolve throughout conflict instead of traditional pre-determined nature.

Elements Related to Command

- Early and continuous Strategic-Operational interaction.

- Adaptive command and control architecture whose formation and structure derives from the unfolding character of conflict.[51]

- Campaigns serving as protracted learning experiments designed to reveal the nature of the conflict to operational-level command and operational designers. This learning and discovery will influence adaptation within both the command structure and forms of maneuver (autopoiesis).

- Redefining the Boyd Cycle of Observe-Orient-Decide-Act loop for future conflicts. Observation and orientation involving an unobservable enemy is analogous to playing poker against an enemy we cannot see yet he can see everyone one of our players and cards prior to making his move. This possesses implications towards maneuver as a learning operation. Similarly, maneuver should evolve towards hidden and amorphous structures to deny the enemy the ability to observe/orient better than our forces.

- Conflicts characterized by compression of strategic-operational-tactical levels.

- Application of operational design to the development of future campaigns. Planning construct evolving towards Design-Plan-Direct-Redesign at the operational level.[52]

Elements of Maneuver

- Evolution of maneuver elements capable of rapidly changing form and structure based upon enemy threat, environment and emerging conflict characteristics. Rapid transformation between traditional unit formations, distributed operations, and other currently undeveloped capabilities.

- High-degree of integration between conventional-SOF-civilian intelligence personnel at the tactical/micro tactical level. Less differentiation between conventional-SOF forces in future conflicts that includes shifting and blending of capabilities to address emerging threats. Conventional forces become more SOF-like while SOF capabilities continue to evolve further.

- Less differentiation between civilian elements and military forces in complex environment.

- Increasingly hidden military forces derived from evolving maneuver techniques and new paradigm of operational theory. For example, non-uniformed personnel, advance force operations personnel for conventional forces, etc.

- Developing a tactical/micro tactical "toolbox" of methods to achieve campaign aims to include novel forms of maneuver. (Urban swarm, fractal maneuver, etc.)

- Subordinate leaders as experts at distributed warfare; culturally aware; understanding of highly discriminating application of force.

Temporal/Spatial Elements

- Prolonged/protracted conflicts and campaigns with significant residual effects on national

morale, information operations, and coalition strength. One logical outgrowth is extensive clandestine, advance force operations capabilities.

- Reinterpretation of urban battlespace to include redefined understanding of urban architecture. Employing the subversion of space, similar to the "moving through walls" concept employed by the IDF. Maneuver and battlespace without fronts, rears, borders, or unit boundaries. Operations conducted within an amorphous, complex environment.

- Employment of novel maneuver and hidden forms to force enemy to reveal his nature, location, and intentions.[53]

- Ability to leverage and integrate appropriate urban population control measures within overall campaign design (mitigation of displaced persons, civilian casualties, etc.).

The Way Ahead

Successful development and evolution of a new operational theory to address the emerging military problem requires a broad intellectual debate similar to the operational revolution of 1976-1986. Key leadership, civilian intellectuals, and military thinkers must accurately frame the emerging problem, incorporate the foundations of previous operational theory and the enduring work of John Boyd and others, to provide a cognitive foundation. From this and the broad application of existing scientific and inter-disciplinary theory, a new paradigm will likely evolve for the emerging operational environment and threats. This idea breaks the technology-centric approach that drives existing Joint doctrine and concepts development and better reflects the humanistic nature of future conflict or "war among the people." The development of a new operational theory directly influences evolving doctrine and concepts and better informs research and development, technological and tactical innovation, and training requirements. Developing an operational framework and theory for future conflict, will ensure DOD avoids the "idealization of tactics" that yields unfocused concepts, erodes future warfighting capabilities, and wastes vast funding resources. The operational environment unfolding before the United States in the 21st Century draws intriguing parallels with the nation's last military intellectual revolution. The response to this must have equally profound results.

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ENDNOTES

[1] Shimon Naveh, In Pursuit of Military Excellence, (London: Frank Cass Publishers, 1997), 253. General Dupuy is widely credited with initiating the theoretical evolution that resulted in a profoundly different approach to the operational level of war a decade later. Naveh relates the initial steps taken by Dupuy to quickly institute a new conceptual approach to the conditions facing the Army. The author also highlights the shortfalls of the rush to produce a doctrinal product and the shallow cognitive effort to address a numerically superior opponent.

[2] Naveh, 295-299. The author traces the development of these three intermediate concepts from General Starry's experiences with V Corps through to the publication of the 1982 version of AirLand Battle. Significant features of this process manifest from General Starry's belief that operational theories or concepts initiate at any echelon within warfighting units and that TRADOC articulates and integrates these concepts while the Combined Arms Center at Fort Leavenworth ultimately finalizes them into Doctrine. This process provided the framework through which hand-selected officers propelled the evolution of AirLand Battle. Naveh also elaborates on the introduction of systemic thinking and the deep recognition of Soviet operational theory. Through the development and analysis of these concepts, Naveh describes the initial genesis of the idea of synchronization and the inherent tension between forces striking an enemy system in depth-an operational conception-with the tactical principles of mass and concentration. These ideas formed the genesis for the evolution of the 1982 doctrine.

[3] Naveh, 262-276. See Also: Robert Coram. Boyd: The Fighter Pilot Who Changed the Art of War. New York: Little, Brown and Company, 2004.

[4] General Paul K. Van Riper, (Ret.) presented this concept of the dialectic approach to Air-Land Battle to this author. He proposed Active Defense as the thesis, Central/Integrated/ Extended Battle as the antithesis, and AirLand Battle as the synthesis. The large number of published articles, books, conferences, and debates that included military and civilian intellectuals reflected the discourse that enabled this dialectic. See Also: John J. Romjue. From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982. Fort Monroe, VA: TRADOC, 1984.

[5] Eyal Weizman, "Lethal Theory," Roundtable: Research and Architecture, 9 May 2006, 53.

[6] Prior to 1991, the terms "Operational Theory" and "Operational Concept" were synonymous. Since this time, an evolving joint lexicon distorted the meaning and understanding of operational concepts adding confusion to intellectual military debate. For clarity, this paper uses the term operational theory to capture the original meaning and its rightful position above existing concepts. Operational theory provides a broader framework of understanding. See: David A. Fastabend, "That Elusive Operational Concept," Army Magazine, June 2001, 12-19. Similarly, a deluge of terms appeared to address the threat poised by Al Qaeda and other insurgent groups since 9/11. Terrorism, irregular warfare, hybrid warfare, unconventional warfare, 4th generation warfare and countless others have arisen to describe the perceived threat. For clarity, all of these terms and actions will be referred to as insurgency with the perpetrators referred to as insurgents. This title best describes both the threat and the aims of the groups involved. See:

Christopher M. Blanchard, "Al Qaeda: Statements and Evolving Ideology," CRS Report For Congress, 20 June 2005, 5. See Also: Michael F. Morris, " Al Qaeda as Insurgency," (Carlisle Barracks, PA: U.S. Army War College, 2005), 1-14.

[7] Peter Paret, "The Genius of On War," Carl von Clausewitz' On War, (Princeton, New Jersey: Princeton University Press, 1984), 14-15.

[8] Paret, 15. This synthesis of the roles of theory, originally presented by Paret, are further described by: David A. Fastabend, "A General Theory of Conflict: Bosnia, Strategy and the Future," U.S. Army War College Fellowship Research Project, Hoover Institution, Stanford University (Carlisle Barracks, Pennsylvania: U.S. Army War College, 1 May 1996), 12.

[9] David A. Fastabend, "That Elusive Operational Concept," Army Magazine, June 2001, 14.

[10] Department of Defense, Quadrennial Defense Review, (Washington, DC: Government Printing Office, 2006), 24. The document recognizes urban operations in the context of needing improved urban capabilities. This recognition appears as the ninth of 14 areas of improvement required to defeat terrorist networks.

[11] See: Irregular Warfare JOC and other published concepts at the Joint Doctrine Website. See the Irregular warfare at http://www.dtic.mil/futurejointwarfare/concepts/iw_jocv11.doc . The IW JOC mentioned the urban environment once in the body of the document through a quote by David Kilcullen and once in the glossary.

[12] The "new sciences" in this instance references a growing body of formal sciences emerging predominantly in the past 50-70 years. These fields include among others: systems theory, complexity theory, chaos theory, cybernetics, bifurcation theory, catastrophe theory, fractal analysis, and nonlinear dynamics. See Frans Osinga. Science, Strategy, and War: The Strategic Theory of John Boyd. The Netherlands: Eburon Academic Publishers, 2005.

[13] Thomas S. Kuhn, The Structure of Scientific Revolutions, (Chicago: The University of Chicago Press, 1962), 66-76. Kuhn articulates that paradigm shifts are usually the result of scientific revolution and reflect the normal development pattern within mature sciences or fields. (Pg. 12) He further defines paradigm shifts as both large and small revolutions. The former, like Copernicus or Newton, have far-reaching consequences, while the later may only affect a particular field or sub-specialty. The relationship between Kuhn's theory of scientific revolution and revolution in military theory is profound.

[14] Chairman of the Joint Chiefs of Staff. Joint Pub 3-06, Doctrine for Joint Urban Operations, (Washington, DC: The Joint Staff, 16 September 2002), 52-68. See also: Defense Adaptive Red Team, "An Operational Concept for Future Joint Urban Operations," (Alexandria, VA: Institute for Defense Analyses, 27 January 2003), 3-4.

[15] Christian Lowe, "Nowhere to Hide," Marine Corps Times, 22 May 2006, 14. Some institutional efforts exist to broaden Distributed Operations to the operational and strategic level including recent briefs developed by Marine Corps Combat Development Command and Marine

Forces Pacific. However, these efforts lack a broader operational theory or framework. Arguably, these efforts to broaden distributed operations are just budgetary-focused, new terminology for the traditional expeditionary missions performed by the Navy-Marine Corps team.

[16] Shimon Naveh, "The Emergence of Rhizomic Maneuver," (Frankfurt, Germany: Dictionary of War, 2006), 3.

[17] James J. Schneider, "Theoretical Implications of Operational Art," Military Review, September 1990, 18-27. Schneider discusses the foundations of operational art, particularly the fundamental changes in this realm brought about by the industrial revolution. In particular, he highlights the work of Sigmund von Schlichting who focused on von Moltke's campaigns and the qualitative change occurring in the conduct of war. In a similar sense, this transformation and the implication of the industrial revolution on warfare are useful in narrowing the study of historical urban operations.

[18] General Anthony Zinni. Interview by John Schmitt. 29 May 2003. See also: Lou DiMarco, "Attacking the Heart and Guts: Urban Operations through the Ages," Block by Block: The Challenges of Urban Operations (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 2003), 2-3.

[19] U.S. Marine Corps, MCDP 1-1 Strategy, (Washington, DC: Headquarters Marine Corps, 1997), 54-55. Observation on the character of recent modern urban conflict synthesizes the general characterization of the battles listed in Appendix 3 of this paper when compared to the existing strategies recognized in this source for classic military strategy. Today, the United States still recognizes two military strategies: annihilation and attrition/erosion.

[20] Lee Grubbs, "In Search of a Joint Urban Operational Concept," (School of Advanced Military Studies, U.S. Army Command and General Staff College, 2003), vii-ix.

[21] Rupert Smith, The Utility of Force, (New York: Alfred A. Knopf, 2007), 262-265.

[22] John Boyd, "Patterns of Conflict," http://www.d-n-i.net/boyd/patterns.ppt.

[23] Boyd, 94-99.

[24] Because of the scope of material published during the past four years on Iraq, insurgency, China, and emerging threat characteristics, this paper will focus more heavily on the urban operating environment. However, it will draw connections between enemy characteristics and the urban environment where applicable and illustrate that these lenses also provide a critical eye to enemy characteristics in the development of an operational theory.

[25] David Kilcullen, "Irregular Warfare-A Systems Assessment," Canberra, Australia: Royal Australian Infantry, 2004-2005. See also: David Kilcullen, "Countering Global Insurgency: A Strategy for the War on Terrorism," (Canberra, Australia: Royal Australian Infantry, 2004), 17. Kilcullen applies a systemic approach to insurgency and promotes understanding of modern insurgency as a complex adaptive system. Other related sources include: Daniel Q. Greenwood, "Combined Action Counterinsurgency Concept: A Proposed Framework for Future

Counterinsurgency Operations," (USMC Command & Staff College: Quantico Virginia, 2006), 2-5.

[26] Structurally complex systems are usually more mechanical or linear by nature. The automobile and airplane are excellent examples of structurally complex systems where calculable inputs generally create predictable outputs. A lack of fuel or malfunction produces a tangible and predictable result. Conversely, interactive complex systems are non-linear and adaptive. An ecological system is the customary example of a system where minor perturbations often create incalculable outcomes. When these elements combine, the resulting system achieves new levels of complexity and emergent potential. An urban system or existing global economic systems are excellent examples of the combinatorial complexity of non-linearity and adaptation. For additional information on complex adaptive systems, see: Yaneer Bar-Yam, "Complexity of Military Conflict: Multiscale Complex Systems Analysis of Littoral Warfare," (Newport: New England Complex Systems Institute, 2003), 1-5. See also: Andrew Ilachinski, Land Warfare and Complexity, Part II: An Assessment of the Applicability of Nonlinear Dynamics and Complex Systems Theory to the Study of Land Warfare, (Alexandria, VA: Center for Naval Analysis, 1996), 2-136. See also: Linda P. Beckerman, "The Non-Linear Dynamics of War," 20 April 1999, <http://www.belisarius.com/modern_business_strategy/ beckerman/non-linear.htm> (21 January 2006).

[27] Roger J. Spiller, Sharp Corners: Urban Operations at the Century's End. (Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 2000), 12. Most urban centers reflect either evolution from an original plan or growth from successive plans overlaid upon each other. This natural progression within the urban environment manifests the human interaction, adaptability, and perseverance of the city as a complex adaptive system.

[28] Spiller, 98. Spiller states that "Cities never exist in a vacuum but only as part of a wider network of settlements. Real cities have never and do not now exist in a vacuum. Every city exists with a physical network of other cities towns and villages, suburbs, or exurbs. See also: Spiro Kostof, "The City Shaped: Urban Patterns and Meanings through History," (Boston: Little Brown and Company, 1991), 38.

[29] John Schmitt, "Combat in the Urban System," (Alexandria, VA: Institute for Defense Analyses, 23 August 2003), 4. Schmitt highlights that certain structurally complex systems within cities offer mechanistic behavior, for example, a power grid. Interactively complex systems, for example local government, reflect much more complex behavior and their interaction with adjacent cities/networks facilitate emergent and unpredictable behavior that defies reductionist analysis.

[30] Schmitt, 5.

[31] Schmitt, 2.

[32] Donn A. Starry, Block by Block: The Challenges of Urban Operations, (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College Press, 2003), viii-ix.

[33] Schmitt, 3.

[34] James T. Conway, 34th Commandant's Planning Guidance, (Washington DC: Headquarters Marine Corps, 2006), 6. The "Arc of Instability" is not a new concept and is often a hotly contested topic. National Security Adviser Zbigniew Brzezinski originally coined the phrase "arc of crisis" to describe the Middle East and Southeast Asia and its description is used today to describe the lesser developed countries depicted in Appendix 7. For the argument against this particular phrase see: Thomas P.M. Barnett, The Pentagon's New Map. New York: G.P. Putnam's Sons, 2004. This particular categorization is, however, useful for assessing future urban operations based on population growth, population density, urban density, and percentage of urban growth.

[35] United Nations Economic and Social Development, "Population Growth, Structure, and Distribution," 2005, http://www.un.org/esa/population/publications/WUP2005/2005wup.htm (12 December 2006).

[36] Ralph Peters, "The Human Terrain of Urban Operations," Parameters, Spring 2000, 4-12. Peters proposes Jerusalem as the epitome of a multicultural city.

[37] The same differences apply on a broader global scale. A city in Venezuela will have vastly different structures, shapes, and form that derive from its component parts. It is incumbent upon military planners to both understand this dynamic interaction as well as the associated physical peculiarities.

[38] Louis A. Dimarco, "Traditions, Changes, and Challenges: Military Operations in the Middle Eastern City," (Fort Leavenworth, KS: Combat Studies Institute, 2004), 8-12. Dimarco provides an excellent description of the historical and human role in the development of Middle Eastern cities. Most significant is his description of modern cities and their component parts based on years of evolution and development. Only through understanding these component parts will military planners grasp the correct facets of this complex physical terrain.

[39] Weizman, 53-70. See also: Gilles Deleuze and Felix Guattari, A Thousand Plateaus, (Minneapolis: University of Minnesota Press, 1987), 352-365. Deleuze and Guattari focus a great deal of their work on the concept of deterritorialization. However, the aspect of striated and smooth space is particularly relevant to urban operations. In one pointed description, they liken the traditional interpretation of urban space to the game of chess in which a very hierarchical and regimented architecture controls the form and function of the environment. Conversely, they reflect on the game of GO as the "smoothed version" of this striated space. "A GO piece has only a milieu of exteriority, or extrinsic relations with nebulas or constellations, according to which it fulfills functions of insertion or situation, such as bordering, encircling, and shattering."

[40] Weizman, 53-70. Facing an invisible enemy embedded in a passively supporting populace, the IDF planned and executed an adaptive campaign minimizing collateral damage and civilian casualties. The IDF employed highly dispersed maneuver elements in a technique dubbed "moving through walls" that relied upon decentralized elements entering the city and moving undetected throughout the entire operation. Building-to-building, avoiding open spaces and danger areas, this fractal maneuver shocked and disoriented the enemy system. **(See Figures 1-3)** The tactical successes of the Nablus operation, and the contrasting failure in Mogadishu, are not

the long-term lessons of import for a future JUOC. Rather, it is the conceptualization of the enemy system within the urban environment combined with the understanding of urban design and architectural theory that informs operational level decisions. See also: Weizman, 53-70. See also: Bernard Tschumi, "Questions of Space: Lectures on Architecture," The Manhattan Transcripts, 1990, 32-33 and 100-107. See also: Tschumi, Bernard. Architecture and Disjunction. Cambridge: MIT Press, 1994. Naveh similarly employs the concepts of architect Bernard Tschumi to provide tools and concepts for interpreting the relationship between space and action. Tschumi avoids one single perspective and incorporates many viewpoints with a variety of different social perspectives. The work of the Situationists movement and Guy Debord also provides an alternative perspective that potentially enriches planning efforts. Debord's concept of detournement, the adaptation of abandoned buildings for alternative purposes, is evident in the Nablus operation. The concept of derive′ or drifting through a city without distinctions for private space and public space is equally compelling. Analysis and study of these elements of architectural theory should not become overbearing or it risks becoming too esoteric. Rather, they provide the third lens, or tool, through which military planners can interpret and understand the urban system and better design operations within its complexity. The idea of a toolbox through which military planners can draw necessary "tools" for application is not new to military planners. Eyal Weizman uses this term in his article "Lethal Theory" purposefully. Renowned philosopher Michael Foucault, who worked closely with the above-sited Deleuze, referred to his writings as a toolbox from which users can apply his summations as needed. See also: Michel Foucault, "Prisons et asiles dans le mécanisme du pouvoir," Dits et Ecrits, (Paris: Gallimard, 1994), 523-4.

[41] See: Michael Polanyi. Knowing and Being. London: Routledge and Kegan Paul, 1969. Michael Polanyi was a respected scholar whose work spanned the fields of economics, physical chemistry, and philosophy. The sited works covers many fields including how scientists perceive opportunity for discovery. His work in this realm and philosophy greatly influenced the research of Thomas Kuhn. See also: Murray Gell-Mann. The Quark and the Jaguar, Adventures in the Simple and the Complex. New York: Freeman & Company, 1994. Gell-Mann is a Nobel Prize-winning physicist whose work spans subjects from particle theory to the new sciences.

[42] For extensive analysis of the research of John Boyd and deeper understanding of his theory see: Frans Osinga. Science, Strategy, and War: The Strategic Theory of John Boyd. The Netherlands: Eburon Academic Publishers, 2005.

[43] Personal email from Lieutenant General Paul K. Van Riper dated 4 September 2006. The author of FMFM 1 Warfighting, John Schmitt, acknowledges he wrote the Marine Corps' Maneuver Warfare doctrine with the Soviet Union as its focus. However, he articulates that the character of the doctrine is a broader and more enduring nature.

[44] Shimon Naveh, "Rhizomic Maneuver," (Berlin: Dictionary of War, 2006) 1-14. Naveh contends that most Western armies employ industrial-based maneuver, which is increasingly irrelevant to the emerging threats from terrorist groups and insurgent organizations.

[45] Naveh, In Pursuit of Military Excellence, 80.

[46] Naveh, 236.

[47] Chairman of the Joint Chiefs of Staff. Major Combat Operations Joint Operating Concept, (Washington, DC: The Joint Staff, December 2006), 11.

[48] James J. Schneider, "A New Form of Warfare," Military Review, January-February 2000, 56-61.

[49] Joint doctrine and the articles by Grubbs and Schneider all contain some reference or support for attacking nodes, nodal analysis and decisive points. This author contends that these elements are counterproductive to an operational theory based on Operational Shock.

[50] Boyd, 116-145.

[51] Naveh, "The Emergence of Rhizomic Maneuver," 9. Also referred to as morphogenetic maneuver and autopoietic command architecture.

[52] Naveh, 9.

[53] Naveh, 11. The author continues to develop the concept of morphogenetic maneuver by proposing that hidden enemy elements can only be forced to reveal his form or "show his hand" by hiding our own form and structure from him. This approach has direct application to the potential evolutionary modifications proposed in this paper for Boyd's cycle.