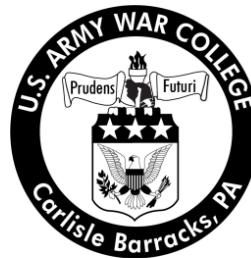# Strategy Research Project

A Symbiotic Relationship:
The OODA Loop, Intuition, and Strategic Thought

by

Lieutenant Colonel Jeffrey N. Rule
United States Marine Corps

United States Army War College
Class of 2013

REPORT DOCUMENTATION PAGE

1. REPORT DATE *(DD-MM-YYYY)* xx-03-2013	2. REPORT TYPE STRATEGY RESEARCH PROJECT	3. DATES COVERED *(From - To)*
4. TITLE AND SUBTITLE A Symbiotic Relationship: The OODA Loop, Intuition, and Strategic Thought		**5a. CONTRACT NUMBER**
		5b. GRANT NUMBER
		5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S) Lieutenant Colonel Jeffrey N. Rule United States Marine Corps		**5d. PROJECT NUMBER**
		5e. TASK NUMBER
		5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Dr. Tami Biddle Department of National Security and Strategy		**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army War College 122 Forbes Avenue Carlisle, PA 17013		**10. SPONSOR/MONITOR'S ACRONYM(S)**
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Distribution A: Approved for Public Release. Distribution is Unlimited.

13. SUPPLEMENTARY NOTES
Word Count: 7713

14. ABSTRACT

Numerous articles and books have recently appeared criticizing current leadership of the Armed Services and their collective inability to think critically, to adapt, or to innovate quickly – as well as their lack of tactical, operational, or strategic agility. However, the services have not sat idle; their individual doctrines, educational institutions, and professional journals abound with the need to create more adaptive, agile, and thinking leaders – and have done so for quite some time. Why have the solutions remained elusive? While the problem is surely complex, this paper will examine ways to enhance innovative thought and develop pedagogical methodologies necessary to maintain a competitive advantage for the US military (ideally the entire US government) in a volatile, uncertain, complex, and ambiguous world. This paper will argue that a significant step toward addressing the problem could be made by the adoption of the work of John Boyd into the curriculum of professional military education (PME). It is time for a paradigm shift and revolution in military affairs that begins with the way we think and learn about complex problems on today's battlefield.

15. SUBJECT TERMS
OODA loop, Intuition, Innovation, Synthesis, Pedagogical Methods, Recognition-Primed Decision Making

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT UU	**b. ABSTRACT** UU	**c. THIS PAGE** UU	UU	36	**19b. TELEPHONE NUMBER** *(Include area code)*

USAWC STRATEGY RESEARCH PROJECT

A Symbiotic Relationship:
The OODA Loop, Intuition, and Strategic Thought

by

Lieutenant Colonel Jeffrey N. Rule
United States Marine Corps

Dr. Tami Biddle
Department of National Security and Strategy
Project Adviser

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

Abstract

Title:	A Symbiotic Relationship:
	The OODA Loop, Intuition, and Strategic Thought
Report Date:	March 2013
Page Count:	36
Word Count:	7713
Key Terms:	OODA loop, Intuition, Innovation, Synthesis, Pedagogical Methods, Recognition-Primed Decision Making
Classification:	Unclassified

Numerous articles and books have recently appeared criticizing current leadership of the Armed Services and their collective inability to think critically, to adapt, or to innovate quickly – as well as their lack of tactical, operational, or strategic agility. However, the services have not sat idle; their individual doctrines, educational institutions, and professional journals abound with the need to create more adaptive, agile, and thinking leaders – and have done so for quite some time. Why have the solutions remained elusive? While the problem is surely complex, this paper will examine ways to enhance innovative thought and develop pedagogical methodologies necessary to maintain a competitive advantage for the US military (ideally the entire US government) in a volatile, uncertain, complex, and ambiguous world. This paper will argue that a significant step toward addressing the problem could be made by the adoption of the work of John Boyd into the curriculum of professional military education (PME). It is time for a paradigm shift and revolution in military affairs that begins with the way we think and learn about complex problems on today's battlefield.

A Symbiotic Relationship:
The OODA Loop, Intuition, and Strategic Thought

Machines don't fight wars. People do, and they use their minds.

—Col John R. Boyd

In recent years numerous articles and books have criticized the U.S. Armed Services for their collective inability to think critically, to adapt, or to innovate quickly — as well as their lack of tactical, operational, or strategic agility.[1,2] Many of the same critiques have emanated from the services themselves for decades — most notably during and after the Vietnam War. Furthermore, there is a large body of literature in the broad realm of "strategic studies" that seeks to offer knowledge about how to operate in the most fraught wartime environments — those characterized by friction, uncertainty, disorder, fluidity, and complexity. From Sun Tzu's time, through Clausewitz, Liddell Hart, and to the modern era, those elements of the environment remain constants in the nature of war.

All U.S. military institutions understand these constants and have, through the years, sought to comprehend and conquer them. The services have not sat idle: their individual doctrines, educational institutions, and professional journals all seek ways to create more adaptive and agile leaders — and have done so for quite some time. But if the problem has existed for so long, why have solutions remained so elusive? Why do the services still struggle to create agile leaders able to cope with the complexity and unpredictability of war?

The Problem and the Solution

While the problem is surely complex, this paper will examine ways to enhance innovative thought and develop pedagogical methodologies necessary to maintain a

competitive advantage for the US military in a volatile, uncertain, complex, and ambiguous world. This paper will argue that a significant step toward addressing the problem could be made by the adoption of the work of John Boyd into the curriculum of professional military education (PME).[3]

Colonel John Richard Boyd, USAF (ret) was born on 23 January 1927 in Erie, Pennsylvania. Reaching military service age, he volunteered and enlisted in the Army Air Corps in 1944 and served time in Japan on occupation duty. Upon completion of service he attended the University of Iowa to study economics, and was known for his voracious reading.[4] After graduation, he returned to the service and was commissioned as a Second Lieutenant in June of 1951 in the United States Air Force.

Boyd became a fighter pilot and did a short stint in Korea where he established himself as the leader in tactics for the squadron.[5] Upon his return to the United States, Boyd was an instructor at the Air Force's Advanced Flying School at Nellis, Air Force Base in Nevada where he published the definitive manual on air combat tactics. This 1960 manual, titled *Aerial Attack Study,* is still the definitive manual on aerial tactics used today throughout the world. Boyd was a Captain and only thirty-three when he wrote the manual.[6]

From Nellis, Boyd, still on active duty in the Air Force, went to Georgia Tech to earn an engineering degree. It was during his studies here that he invented the Energy-Maneuverability (E-M) Theory that radically changed how all aircraft for the military were designed. In Robert Coram's biography of Boyd, he states, "E-M was as clear a line of demarcation between the old and the new as was the shift from the Copernican world to the Newtonian world."[7] Boyd continued to make lasting contributions to the Air Force,

but the manner in which he made those changes created many enemies throughout his 24-year career and likely led to the Air Force's decision to not make him a general officer. Boyd retired from the Air Force on 31 August 1975 and went to work full time on his intellectual pursuits, mostly delivered through lectures and an essay on analysis and synthesis titled, *Destruction and Creation*. It was during this time that Boyd developed his most significant breakthrough on modern warfare theory, the Observe-Orient-Decide-Act (OODA) loop, which will be described in detail over the next several pages. Boyd passed away on 9 March 1997.

Boyd left us with little written work, but with invaluable insights into what is needed to gain a competitive advantage in any environment or any situation, retaining the ability to hold the initiative and move forward on one's own terms. As this paper will argue, understanding Boyd's work, specifically the depth and complexity of the OODA loop theory, is an optimal way to create agile leaders who can cope successfully with unknowable threats of our future. And it is, most importantly, a uniquely effective way to protect our most precious resource and treasure — the lives of our citizens and service members.

Why Haven't We Embraced Boyd's Work?

There are a few main reasons why the joint military community has not embraced Boyd's work.[8] The first is simply that the work is not readily accessible. Boyd did not commit it to text, or otherwise find a way to make it readily available to those who might wish to use it. The vast majority of his work was presented orally — in lengthy slideshows that would last, in some cases, for days. He published a short but intellectually intense essay on analysis and synthesis titled, *Destruction and Creation*. Before Dr. Frans Osigna published his dissertation, *Science, Strategy and War – The*

Strategic Theory of John Boyd, in 2007, there was no single document that presented Boyd's thought in a comprehensive and systematic way. Only those who had been present for one of his slideshows had any real opportunity to listen to his thoughts let alone study and understand them. He roamed into realms of physics, economics, and philosophy, bringing them together in ways that were unique but not always easily accessible.

Second, Boyd was a warrior fighter pilot who attacked the military bureaucracy during the majority of his career. Boyd created many enemies along the way, and while a key theme in his work involves accepting and analyzing ideas in order to create new relationships or ideas, he was quick to overwhelm and shoot down all challengers regardless of rank or venue. Moreover, during his involvement in the Military Reform Movement of the late 1970's and early 1980's he openly attacked the military bureaucracy, with the support of Congress, and left an open wound with the Air Force and Navy. This limited the acceptance of his other ideas, regardless of their merit.

Third, Boyd's OODA loop has been largely misinterpreted as purely tactical. Military institutions appropriating Boyd's work have packaged the OODA loop as a simplistic, one-size-fits-all, intellectual product. Sometimes Boyd's work is described merely as a restatement of the idea of "initiative." Major Don Vandergriff (USA, ret), a proponent of Boyd's work, has published manuals and handbooks in which he exhaustively explains how the contemporary U.S. military education system is based upon linear deduction associated with the industrial-age, and based on the French military education system. This is most obvious in the Army's use of the military decision making process (MDMP). He states that reliance on the MDMP has served the

industrial age army well because, "It affords a common method for solving problems and making decisions by individuals possessing knowledge and experience from the novice through the expert. Its use should produce optimal solutions to the problem or at worst, produce plans that should not fail."[9] Boyd's work does not lend itself to a clean MDMP type process and requires a significant, but achievable, intellectual effort to understand. Yet, as Vandergriff states:

> Asymmetric Warfare suggests that as nation-states shift from the old Westphalia model to some newer derivation, the Army will encounter increasingly chaotic forms of opposition. The result of this shift will be the requirement to wage war effectively against emerging non-state actors employing new methods for which the current Army must adapt to overcome.[10]

<center>The OODA Loop and Importance of Boyd's Work</center>

Boyd's OODA loop is the capstone theory to his life's work. Although typically discounted as only tactically relevant, it is not confined to one level of conflict such as the tactical, operational, or strategic level of war. Likewise, it is not confined simply to combat and the military, but is relevant to every type of competition. The OODA loop explains human interaction among individuals or political groups in a competitive environment. Understanding the OODA loop gives one the ability to get inside the time/space decision making cycle of an opponent, and thus maintain a competitive advantage. It also helps one to develop a more agile organization, and, when encountering an adversary, to decrease his agility through isolation.

The OODA loop theory is best represented through figure 1 drawn by Franklin C. Spinney, one of Boyd's closest associates. Note his description of the importance of orientation and how central to the OODA loop. It is quite easy to see the complexity of the OODA loop through this sketch.

<center>5</center>

Boyd's OODA "Loop" Sketch

Observe   **Orient**   **Decide**   **Act**

Unfolding Circumstances

Outside Information

Implicit Guidance & Control

Observations

Feed Forward

Cultural Traditions

Genetic Heritage

Analyses & Synthesis

New Information

Previous Experience

Feed Forward

Decision (Hypothesis)

Implicit Guidance & Control

Feed Forward

Action (Test)

Unfolding Interaction With Environment

Feedback

Feedback

Unfolding Interaction With Environment

Note how orientation shapes observation, shapes decision, shapes action, and in turn is shaped by the feedback and other phenomena coming into our sensing or observing window.

Also note how the entire "loop" (not just orientation) is an ongoing many-sided implicit cross-referencing process of projection, empathy, correlation, and rejection.

From "The Essence of Winning and Losing," John R. Boyd, January 1996.

Defense and the National Interest, http://www.d-n-i.net, 2006

August 2006   © 2006 Kettle Creek Corporation

Figure 1. Franklin C. Spinney's graphic representation of Boyd's OODA loop.

The Orient and Decide portions of the loop are internal processes, where as the Observe and Act portions interact with the external world. While the orient phase is at the heart of the OODA loop, it is the dialectic engine of analyses and synthesis (understanding and creativity) that is at the heart of orientation. It is here where the creative nature of the individual or organization makes it unpredictable. Also note how the feedback loops occur throughout the process, depicting it is not simply the O-O-D-A

6

construct, but one that, as stated above, "is an ongoing many-sided implicit cross-referencing process..."

The more simplistic version that leads to common misinterpretations of the OODA loop is found in figure 2.
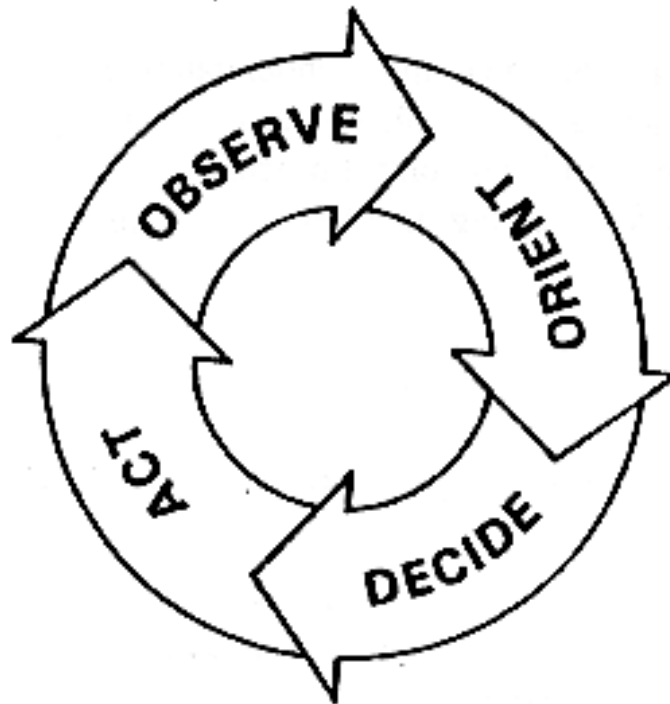
**Figure 2. The command and control process:
The OODA loop.**

The contrast between the two drawings is obvious, and it is easy to understand how many can over-simplify the OODA loop. Strategist Colin Gray has explained that "the OODA loop may appear too humble to merit categorization as a grand theory, but that is what it is. It has an elegant simplicity, an extensive domain of applicability, and contains a high quality of insight about strategic essentials…"[11]

Boyd's OODA loop could be effectively employed by today's military to help in the education of agile leaders, and to help create agile organizations. A key, but often misunderstood, concept in Boyd's work is the idea of the time/space relationship — also known as tempo — in regard to decision-making. Tempo and speed are not synonymous. Tempo is a relationship between time and space, with the goal of presenting an adversary with ambiguous, deceptive, or novel situations. But comprehending tempo requires that one first understand the "Orientation" phase in Boyd's OODA loop. As figure 1 states, observations are part of the external world, but they are shaped by an individual's orientation. A simple example to bring this concept to light is a pyramid. If you can only see the pyramid from the side, it is only a triangle due to your orientation. If you are stuck in that orientation and can never view the pyramid from other angles, it will remain a triangle; yet if you can change your orientation and gain different observations, you will be able to synthesize all of those observations and understand that what you are looking at is really a pyramid.

It is in the orientation phase that one can create external unpredictability (through presenting ambiguous, deceptive, or novel situations) while at the same time reinforcing one's own internal harmony (through commander's intent, shared values, discipline, training, etc.). Tempo is more than just making decisions quickly; it is specifically relevant to the adversary's orientation and observations — which also touches on the importance of empathy. The ability of an organization (or individual) to act (or not act) continuously at the right time, in the right place, such that his opponent is forced to react, will lead to ever increasing advantages to the point where the opponent experiences such disorder and confusion that his will to resist is broken.

Similarly, the OODA loop ought not to be reduced to the idea of "initiative", since it is much more than initiative alone.[12] Initiative is part of the OODA loop, but the importance of initiative is not in making decisions *first* regarding your adversary, but rather enabling your organization the ability to make independent and intelligent decisions *in accordance with the commander's intent*. Here the emphasis is on thoughtful, adaptive interpretation of commander's intent. The organization is not tied to hierarchical, top-down decisions in order to act. While response time matters, that response must reflect, "one's judgment to make decisions,"[13] based on a sound assessment of the environment and the adversary.

Boyd studied Clausewitz and Sun Tzu intensely and he frequently embraced and cited their work in his presentations. Their influence on his thinking was significant and his combination of their theories is an example of the analyses and synthesis resident in the orientation phase of the OODA loop. Boyd recognized and celebrated many of the concepts found in Clausewitz's chapter "On Military Genius" in his book, *On War.* A trait specific to military genius is the concept of *coup d'oeil*.

> If the mind is to emerge unscathed from this relentless struggle with the unforeseen, two qualities are indispensable: first, an intellect that even in the darkest hour, retains some glimmerings of the inner light which leads to truth; and second, the courage to follow this faint light wherever it may lead. Their first of these qualities is described by the French term, coup d'oeil, the second is determination.[14]

Clausewitz preceded this description of *coup d'oeil* with a discussion of how war is permeated with uncertainty and that, in this environment of uncertainty, "a sensitive and discriminating judgment is called for; a skilled intelligence to scent out the truth."[15] He also elaborated on this ability to see the truth quickly: "the idea of a rapid and accurate decision was first based on time and space."[16] While this definition can easily be looked

at only in the physical and tactical realm, he explains that it also applies to strategy where rapid decisions are similarly required. Clausewitz comprehended that the concept of *coup d'oeil*, "merely refers to the quick recognition of a truth that the mind would ordinarily miss or would perceive only after long study and reflection."[17] In this statement, Clausewitz is describing what cognitive sciences today address as intuition and recognition-primed decision making.[18] *Coup d'oeil* relates to the orientation phase in regard to understanding one's observations and how that occurs internally in a person's mind or within the organization.

One only need study President John F. Kennedy's actions during the Cuban Missile Crisis to demonstrate the concept in action at the strategic realm. Had he followed the advice of many experts in the Executive Committee (ExComm), the decision may have led to nuclear conflict between the U.S. and Soviet Union. However, President Kennedy out-thought and out-maneuvered his opponent on multiple levels, such that he won the Cuban engagement with barely the loss of a soul. He was able to see the conflict from the Soviet Union's perspective (empathy) and therefore was inside Khrushchev's OODA loop, or decision-making cycle. Once Kennedy could observe the conflict from Khrushchev's orientation, he understood the Russian leader's decisions and actions, ultimately leading to the understanding that the missiles in Cuba were really about the Soviets gaining an advantage in Berlin. This willingness to go inside the mind of his adversary gave Kennedy a vast advantage; it enabled him to see their weaknesses and box them into a wholly disadvantageous position, causing them to back down. This is described in Allison and Zelikow's *Essence of Decision*.

> As Kennedy saw it, his choice in responding to Soviet missiles in Cuba
> was not one between provoking a nuclear crisis over Cuba, or no nuclear

crisis. He could either have a nuclear crisis over Cuba now, when the onus of starting a war would be on Khrushchev, or he could have a nuclear crisis the next month in Berlin, when the U.S. strategic position would be much worse and the burden of initiating a nuclear war would be on Kennedy.[19]

Kennedy was initially confused by the Soviet's placement of missiles in Cuba because Khrushchev was inside of *his* OODA loop. But once he figured out Khrushchev's strategy, he was able to reverse the advantage and ultimately come out of the crisis with a huge win for the U.S. that also helped to build up his own domestic political strength.

Another reason why the OODA loop is not simply about speed or initiative can be seen through Clausewitz's declaration that, "if we pursue the demands that war makes on those who practice it, we come to the region dominated by the powers of intellect."[20] Success in war depends on the will of the fighters and that will is solely controlled by the intellect. This is best encapsulated in Boyd's statement, "Machines don't fight wars. People do, and they use their minds." With his OODA loop, Boyd embraced some of Clausewitz's most penetrating ideas and took them one step further.

This extra step is linked to the Clausewitzian concept of friction. In Book One Clausewitz stated, "We have identified danger, physical exertion, intelligence, and friction as the elements that coalesce to form the atmosphere of war, and turn it into a medium that impedes activity…which can be grouped into a single concept of general friction."[21] In Clausewitz's mind, understanding friction and the severity of its effects on a unit's mental and physical state was an important part of winning.[22] According to Boyd, Clausewitz focused on reducing internal friction but did not project the concept of *inducing friction* in the enemy's system, something that Sun Tzu embraced and

11

articulated in his work.[23] Getting inside of an adversary's OODA loop creates friction

because it isolates the enemy mentally from changing his orientation.

Physical isolation was articulated by Sun Tzu when he asserted that, "To subdue

the enemy without fighting is the acme of skill."[24] He explained that the best way to do

this was to attack the enemy's plans, while the next best effort was to disrupt his

alliances. Least desirable was to attack his army.[25] Sun Tzu was describing how to

target the enemy commander's mind and how to break his will. Samuel Griffith, who

wrote the definitive translation of Sun Tzu's *The Art of War*, has explained, in his

introduction to *The Art of War* that, "The strategic and tactical doctrines expounded in

The Art of War are based on deception, the creation of false appearances to mystify

and delude the enemy, the indirect approach…"[26] He expands on this idea:

> Sun Tzu believed that the moral strength and intellectual faculty of man
> were decisive in war, and that if these were properly applied war could be
> waged with certain success…The master conqueror frustrated his
> enemy's plans and broke up his alliances…The enemy was **isolated** and
> demoralized; his **will** to resist broken…His primary target is the **mind** of
> the opposing commander. (bold emphasis by author)[27]

Boyd understood Sun Tzu's reasoning and he supported it by applying the Second Law

of Thermodynamics, Gödel's Incompleteness Theorem (used in mathematics), and

Heisenberg's Uncertainty Principle as it pertains to the mathematical foundations of

quantum mechanics. Boyd used these theories to describe what isolation does to any

system that has energy – in the human realm, to any organic system. In broad

laymen's terms, the Second Law of Thermodynamics states that in a closed system

entropy always increases — therefore the capacity of the system to do work decreases.

Gödel's incompleteness theorem basically states that it is impossible for any system to

determine its consistency from within itself.[28]

Heisenberg's Uncertainty Principle "can be expressed in its simplest form as follows: One can never know with perfect accuracy both of those two important factors which determine the movement of one of the smallest particles—its position and its velocity. It is impossible to determine accurately *both* the position and the direction and speed of a particle *at the same instant*."[29] The inference here is with observation — it is the intrusion of the observer that produces the uncertainty (disorder and confusion) that is perceived by the observer based on his point of view. Also important here is the idea that an observer's orientation is critical to the understanding of the perceived reality of the situation. With a more complete understanding of the situation (determining consistency from outside the system re: Gödel's theorem), there will be a more accurate observation. The more accurate the observation, the better the decision, which, in turn, will lead to a more effective action. In other words, when you isolate the observer (enemy) such that he cannot understand your actions from another point of view and must understand them based only on his own perceptions, "the observer [your enemy in this case] perceives uncertain or erratic behavior that bounces all over in accordance with the indeterminacy [uncertainty] relation."[30] This creates confusion and friction because the observer [your enemy] cannot make any sense out of his adversary's actions.

Boyd put these theories together, and understanding the larger principles behind the theories, made the statement that:

> According to Gödel we cannot—in general—determine the consistency, hence the character or nature, of an abstract system within itself. According to Heisenberg and the Second Law of Thermodynamics any attempt to do so in the real world will expose uncertainty and generate disorder. Taken together, these three notions support the idea that any

inward-oriented and continued effort to improve the match-up of concept with observed reality will only increase the degree of mismatch.[31]

Therefore, when one takes actions that isolate an enemy such that he is forced to analyze what is happening through focusing internally, one now creates more friction than the enemy will ultimately be able to handle, individually or organizationally.

A concrete example can be found in the Allied invasion of Normandy in June 1944. The Allies manipulated information to suggest to the Germans that the Allied invasion would happen at Pas de Calais instead of Normandy. This information reinforced an idea that the Germans were predisposed to believe. In other words, it was the way the German High Command was already oriented to believe. The German observation of the problem was based on their belief in *their own* perception of reality, which influenced how they positioned forces as well as how they interpreted information from those forces. The Germans were isolated in their own loop and could not re-shape or redefine their orientation before the Allied invasion. According to Franklin C. Spinney:

> The Germans did not catch themselves in time to reshape their Orientation to neutralize the threat posed by unfolding events — and remember time (in the sense of being quicker rather than 'fast') is at the core of the interaction of opposing OODA loops. The D-Day deception took place over a long time, but its quickness was a relative effect that manifested itself in the relatively sluggish awareness of the unfolding reality on the part of the German High Command, who maintained the belief that Pas de Calais was the real target after Allied intentions should have been clear.[32]

This is the essence of what Boyd meant by operating inside the OODA loop of the enemy.[33]

Again, Kennedy's actions during the Cuban Missile Crisis illustrate the idea. Initially, when Khrushchev made the secret move to place missiles in Cuba, Kennedy could not understand why he would execute such a provocative maneuver. This is a

real world example of what Coram states in his biography of Boyd when he talks about the effectiveness gained from understanding the OODA Loop. "To take the least-expected action disorients the enemy. It causes him to pause, to wonder, to question. This means as the commander compresses his own time, he causes time to be stretched out for his opponent."[34] This is exactly what Kennedy experienced when he found out about the missiles in Cuba. However, Kennedy found out about the missiles before they were fully operational, and comprehended his adversary's intent once he drew the relationship between Cuba and Berlin. Thus, he was able to counter Khrushchev's strategy and regain a competitive advantage. Had he not found out about the missiles until they were fully operational or had he never understood Khrushchev's reasoning behind the move, Kennedy would have remained confused, and unable to strategically out-maneuver Khrushchev. Equally critical to Kennedy's understanding of his enemy was his ability to properly orient his Executive Committee on these insights.

Boyd asserted the need to build an agile organization that is capable of operating inside an opponents OODA loop. And he left us with the key parameters necessary to do so in his "Organic Design for Command and Control" brief.

<center>Moving from the OODA Loop to Mission Command</center>

The concept of harmony plays an important role in creating an agile organization that is capable of seizing opportunities and advantages at the lowest levels on the battlefield. If one reads only a few lines of the recent White Paper on Mission Command by the Chairman of the Joint Chiefs of Staff, General Martin Dempsey, one sees that Boyd's influence is pervasive throughout the paper.[35] When studied closely, Mission Command is a philosophy completely in line with, if not a current day restatement of, Boyd's 1987 "Organic Design for Command and Control" brief. In that

<center>15</center>

brief Boyd used logic, scientific theories, and historical examples to explain how "implicit orientation" will allow commanders and their subordinates to:

- Diminish their friction and reduce time, thereby permit them to:

- Exploit variety/rapidity while maintaining harmony/initiative, thereby permit them to:

- Get inside adversary's O-O-D-A loops, thereby:

- Magnify adversary's friction and stretch-out his time (for a favorable mismatch in friction and time), thereby:

- Deny adversary the opportunity to cope with events/efforts as they unfold[36]

Boyd's understanding of both Clausewitz and Sun Tzu is made apparent in his focus on reducing internal friction and maximizing the enemy's friction through "implicit orientation" — or, as he names it elsewhere in the brief, "implicit communication." This is related to the German concept of *Schwerpunkt*, or the focus of effort.[37]

Mission Command enables a shared vision, or commander's intent, up and down the chain of command. It is this shared vision that allows subordinates to act with insight and rapidity (initiative), yet in harmony with the larger objective. As Boyd would say, "Orientation is the *Schwerpunkt*. It shapes the way we interact with the environment—hence orientation shapes the way we **observe**, the way we **decide**, the way we **act**"[38]

In other words, a single overarching focus of effort throughout the depth and breath of an organization enables all members to act on their own initiative, thereby generating the rapidity and variety of action (and thought) necessary to create momentum, but maintaining the harmony necessary to ensure the rope is ultimately being pulled by all in the same direction.

While this notion sounds simple, it is nothing of the sort; and, indeed, it only gets harder as one moves from the tactical to strategic level of war. A quick example at the strategic level would be, for instance, a potential military ally nation with known human rights violations. The Department of Defense might seek military engagement and training opportunities with said nation, however the Department of State might deny any interaction until human rights violations are resolved. In this scenario, with the President, as commander-in-chief, and a clear endstate in peace, tension would arise nonetheless because both departments would likely have very different conceptions of the "right" way forward to achieve the President's endstate. This highlights the importance of the dialectic engine in orientation, or the value of analysis and synthesis. Leaders in interagency departments cannot view complex problems like the one above as zero-sum. They must think, with an understanding of the OODA loop, and figure out a way to accomplish the task innovatively and across department boundaries. The complications associated with executing the above in a bureaucracy with a multitude of stakeholders, competing interests, and a range of personalities, are virtually unlimited. But this only underscores the importance of creating trust across the bureaucracy, and the essential importance of a common higher purpose. And, as Boyd used to say, "You do not have to be perfect, only better than everyone else."[39]

How is this related to the OODA loop? If that ally nation is an uncommitted actor in a competition with a current or potential adversary, you have either strengthened your cause through increasing the isolation (morally, physically, and / or mentally) of your competitor, or you have weakened your cause through denying your ability to intrude

into your competitor's OODA loop and isolating yourself from interaction with an external actor.

<p style="text-align:center">The Power of Intuition and Its Relationship to Orientation</p>

Even among critics, the OODA loop is widely acknowledged as applicable in the tactical and operational levels, where physical combat is prevalent. However, the factors that make the strategic level so complex and the application of the OODA loop so difficult are the very same reasons that it should be studied from entry-level training through senior service college education.[40] For many students, the latter is the first time that they have had to think about complex strategic problems where solutions, if there are solutions, are not obvious. Students must slow down, reflect, empathize, and look at problems from multiple angles. This is where the mis-association of the OODA loop with pure speed can derail its relevance at the strategic level. The time/space relationship matters here just as much, if not more so, than at the tactical level, and the stakes are much higher. The earlier example of the Normandy landing supports this notion. And the example of the Cuban Missile Crisis underscores the power of embracing the OODA loop at the strategic level.

It is here where strategic intuition can be built. Whether a student is a strategic leader or an advisor to a strategic leader, understanding how to think about a problem through a real understanding of the OODA loop saves precious time, focuses efforts in a much more effective manner, and can create the kind of insight Clausewitz defined in his *coup d'oeil* concept. If students can learn how to orient on complex problems intuitively — such that they can identify novelties through different approaches, ask the right questions that uncover different realities, and avoid seeing every problem as a nail

<p style="text-align:center">18</p>

because they are holding a hammer — it is quite possible to realistically prepare them for a VUCA environment where there is no such thing as a school solution.

At the senior service college, this embrace of intuition should come at the start of the year. Rather than simply presenting students with definitions and models, students should be asked to think actively and creatively about their new bodies of material.[41] In his best-selling book, *Blink*, Malcolm Gladwell articulates an idea that might be seen, in the military, as strategic intuition when he argues:

> What was that magical thing? …It's the kind of wisdom that someone acquires after a lifetime of learning and watching and doing. It's *judgment*. And what *Blink* is—what all the stories and studies and arguments add up to—is an attempt to understand this magical and mysterious thing called judgment…Judgment *matters*: it is what separates winners from losers…The key to good decision making is not knowledge. It is understanding. We are swimming in the former. We are desperately lacking in the latter.[42]

The OODA loop theory and the study of it promote the analyses and synthesis to enable a greater understanding of the environment. Understanding *how* to think about problems at any level will develop intuitive thought processes. Encouraging students to employ instinct and insight does not mean encouraging them to simply "go with a gut feeling." It means giving them the opportunities in a safe environment to develop the analysis/synthesis skill sets necessary in Boyd's "Orientation" phase. Another excerpt from *Blink* hits the mark, "The very best and most successful … organizations of any kind—are the ones that understand how to combine rational analysis with instinctive judgment."[43]

Experiential Education Creates Intuitive Problem Solvers

The Army has begun to capitalize on heuristic decision making at the tactical levels through the work of Major Don Vandergriff (USA ret). His *How to Create Adaptive*

Leaders Handbook and *Teaching an Old Dog New Tricks* White Paper Coordinating

Draft explain in detail how to develop adaptive leaders at the tactical level. The work is

heavily influenced by Boyd's OODA Loop as well as the work of Boyd's acolytes,

Franklin C. Spinney and Chet Richards. Vandergriff explains that:

> … today's "crawl-walk-run" or "lecture-demonstration-practical application"
> system used in leader development curriculums … was born out of
> necessity in World War I. The U.S. Army, arriving on the field of battle
> unprepared for large-scale war, followed the French approach based on
> the **Descartes method**, which evolved into the MDMP analytical decision-
> making and merged with the Army's approach to leader development.[44]

This statement explains the nature of the current system of professional military

development and the inherent issues with a system based on Newtonian linear physics.

The current VUCA world is not a problem that can be reduced to component parts and

relationships through detailed analysis alone. It is a complex adaptive system that

requires unique and innovative levels of understanding.

       This does not suggest that analytical problem-solving models like the military

decision making process or the Marine Corps planning process should be eliminated

entirely. Current doctrine on design and problem framing is a step in the right direction

for non-linear approaches to complex problems. The issue here is that we are

fundamentally failing our service members in regard to teaching them how to

incorporate design methodologies or non-linear thinking because of the way we educate

them to begin with. One cannot understand non-linearity with linear approaches. In

short, you cannot teach a student what to think about non-linearity. They have to

experience it and apply it to truly understand it. Teaching *how* to think about problems

enables innovative approaches to solving those problems.

As an example, the U.S. Army War College's (USAWC) first course of instruction, Strategic Thinking, possesses exceptional content but is built around the USAWC's own institutional interpretation of strategic thinking. Students are given material so that they can return the next day to discuss the material. In many respects, this is a closed loop. To hand students a school definition of strategic thinking is to rob them of the opportunity to arrive at it by themselves.

An active learning model that would cause students to experience creative thinking up front would be to task them to create their own definition of strategic thinking with supporting sources. Other methods to promote creative and critical thought up front would be to assess the program's content and then explain scenarios where the USAWC's definition of strategic thinking is flawed, or assign the students a task of explaining why strategic thinking is not important. Through this means you force the student to create something new, and to use a logic trail that may lead to a new discovery. You are building an intuitive thought process and suggesting a new way to look at a challenge. You are teaching students *how* to think, not asking them to simply analyze what you have already told them. This statement from the author's personal correspondence with Chet Richards (Col, USAF ret), one of Boyd's acolytes, demonstrates methods used to develop creative thinking:

> It isn't often that we get a chance to stop and reflect on the nature of strategy, much less what strategic thinking might be ... You might also question why it is necessary to have a definition because if people haven't made "critical, creative, systems" thinking intuitive by the time they get to Carlisle, then all they're going to learn is to give the school solution on the test … Speaking of tests, Boyd once said that the only way a multiple choice exam made sense was to see if you could explain why each answer was correct. Somehow this seems to say something about strategic thinking.[45]

The Value of Developing Intuitive Decision Makers

One cannot underestimate the importance of setting the best cognitive framework to tackle non-linear problems at the beginning of the final level of institutionalized professional military education.

Guy Claxton, a renowned psychologist, reveals in his book, *Hare Brain, Tortoise Mind*, the value of developing intuition, "…the unconscious realms of the human mind will successfully accomplish a number of unusual, interesting and important tasks *if they are given the time*. They will learn patterns of a degree of subtlety which normal consciousness cannot even see…"[46] It is in our PME system where we can create the time to develop the unconscious realms of the human mind. From entry level training for officer and enlisted through the highest levels of formal professional military education, our education must incorporate methods that force students to *experience* creative thinking, not learn about creative thinking through definition and structures that are passively provided to them. Claxton explains:

> To tap into the leisurely ways of knowing, one must dare to wait. Knowing emerges from, and is a response to, not-knowing. Learning — the process of coming to know — emerges from uncertainty. Ambivalently, learning seeks to reduce uncertainty, by transmuting the strange into the familiar, but it also needs to tolerate uncertainty, as the seedbed in which ideas germinate and responses form. If either one of these two aspects of learning predominates, then the balance of the mind is disturbed…if the need for certainty becomes intemperate, undermining the ability to tolerate confusion, then one may develop a vulnerability to demagoguery and dogma, liable to cling to opinions and beliefs that may not fit the bill, but which do assuage the anxiety.[47]

One only has to spend a few months in the military as a leader, in combat or peacetime, to understand the overwhelming pressure placed on individuals to deliver certainty. But the quest for certainty can, in many circumstances, be counter-productive. The Revolution in Military Affairs touted information dominance as a way to reduce uncertainty on the battlefield. More information was equated with better decisions. But

information (especially more information) is only helpful if one's assumptions are sound. Critical thinkers realize it is essential to revisit assumptions with frequency, and with an open mind. They realize, too, that they must be able to see problems through the eyes of their adversary. Only by understanding an adversary's orientation can we begin to gain insight into their minds.

Teaching service members to ask questions that challenge assumptions, to have intellectual patience in the pursuit of answers, and to become comfortable with the confusion associated with complex problems will lead to much greater levels of wisdom.

Intellectual exercises at all PME levels and schools to sharpen this balance would do the opposite of creating "certainty." When students are given complex problems, with the requirement to identify *questions* that must be answered or explored, it may cause confusion and increase uncertainty at first, but it will also increase learning. Such challenges create increased reliance on subliminal strengths. Claxton further states, "Interesting intuitions occur as a result of thinking that is low-focus, capable of making associations between ideas that may be structurally remote from each other in the brainscape."[48] This directly relates to Boyd's use of the "dialectic engine and the analyses / synthesis" methods described in his essay titled "Destruction and Creation."

Major Don Vandergriff has identified the need for and the benefits of increasing intuitive decision-making at officer entry-level programs. But his processes can be utilized at strategic level schools as well. Col Boyd's work needs to be discussed and applied not only at the senior service colleges but at all levels of PME, if, as a joint

force, we are going to create agile thinkers, and innovative complex problem managers. And it is essential if we wish to successfully embrace Mission Command.

Conclusion

Only through understanding the weaknesses in our current pedagogical methodologies will we be able to increase our learning and improve our system. We have been experiencing a model mismatch within our PME system since the Vietnam War, and it is time to embrace advances made in cognitive science and adapt them to our formal learning centers across the Department of Defense. It is time for a paradigm shift and a revolution in military affairs that begins with the way we think and learn about complex problems.

Endnotes

[1] The author would like to thank Dr. Tami Biddle, Col Mike Wyly (USMC Ret.), Col Chester W. Richards (USAF Ret.), Franklin C. Spinney, Maj Don Vandergriff (USA Ret.), and Capt PJ Tremblay, USMC, for without their indispensible wisdom, intellect, and patience, this paper would have never been completed.

[2] *Disruptive Thinkers,* http://smallwarsjournal.com/topics/disruptive%20thinkers (accessed March 6, 2013); Donald E. Vandergriff, "From Swift To Swiss," *Performance Improvement Quarterly* 45, no. 2 (February 2006): 30-39.; Grant Martin, "Design is Dead," November 26, 2012, http://smallwarsjournal.com/jrnl/art/design-is-dead (accessed March 6, 2013); Colin Gray, "Thinking Asymmetrically in Times of Terror" *Parameters Online* (Spring 2002): 5-14, http://www.carlisle.army.mil/USAWC/parameters/Articles/02spring/gray.htm (accessed March 6, 2013).; Thomas Czerwinsky, "Command and Control at the Crossroads" *Parameters Online* (Autumn 1996): 121–132, http://www.carlisle.army.mil/uSAWC/Parameters /Articles/96autumn/czerwins.htm (accessed 6 March 2013).; Toomas Möls, "*Critical and Creative Thinking: Are Innovation and Initiative Welcome in the Military?*," http://www.ksk.edu.ee/wp-content/uploads/2011/03/KVUOA_Toimetised_13_Mols.pdf (accessed March 6 2013).; Keith H. Hammonds, "The Strategy of the Fighter Pilot," *Fast Company Online*, May 31, 2002, http://www.fastcompany.com/44983/strategy-fighter-pilot (accessed March 6 2013); Tom Ricks, *The Generals* (New York, NY: The Penguin Press).

[3] The author wrote this paper during his time as a Class of 2013 student at the US Army War College.

[4] Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (New York, NY: Hachette Book Group, 2002) 35. Kindle e-book.

[5] Ibid., 54.

[6] Ibid., 115.

[7] Ibid., 6.

[8] In the author's opinion, the USMC has attempted to embrace Boyd's work with their base doctrine, first FMFM-1 and now MCDP-1, *Warfighting*, although as an active duty Marine, I remain skeptical that it has been truly embraced or imbued in the institution in practice.

[9] Major Donald E. Vandergriff, *Adaptive Leaders Course (ALC) – Teaching Old Dogs New Tricks*, (Fort Monroe, VA: U.S. Army Training and Doctrine Command, Capabilities Integration Center (Forward), May 10, 2006) 2.

[10] Sergeant First Class Jeffery Roper and Major Donald E. Vandergriff, *How to Create Adaptive Leaders: How to Teach-Facilitate-Mentor Handbook For Instruction of Adaptive Leaders" Teaching Adaptability Handbook*, 3rd draft. (Fort Monroe, VA: U.S. Army Training and Doctrine Command, Futures Center (Forward), December 2, 2005), 6.

[11] Colin S. Gray, *Modern Strategy* (New York: Oxford University Press, 1999), 91.

[12] An example of a common oversimplification of the OODA loop and John Boyd's work comes from the U.S. Army War College Guide to National Security Issues; Volume I: Theory of War and Strategy on page 30. "This theory [OODA loop] describes a way, and really is a new and unnecessarily complicated rephrasing of the ancient concept of the initiative. Initiative is not critical or essential, and alone is not decisive."

[13] Cambridge Dictionaries Online, "Definition of Initiative: Initiative, Noun (judgment)," (Cambridge, UK: Cambridge University Press Online), http://dictionary.cambridge.org/dictionary/ british/initiative_2 (accessed 6 March 2013).

[14] Carl Von Clausewitz, *On War* (Princeton, NJ: Princeton University Press, 1976), 102.

[15] Ibid., 101.

[16] Ibid.

[17] Ibid.

[18] Karol G. Ross et al., "The Recognition-Primed Decision Model," *Military Review* (July-August 2004): 6-10.

[19] Graham Allison and Philip Zelikow, *Essence of Decision – Explaining the Cuban Missile Crisis*, 2nd ed. (New York: Addison-Wesley Educational Publishers Inc., 1999) 104*.*

[20] Clausewitz, 101.

[21] Clausewitz, 122.

[22] Jon Tetsuro Sumida, *Decoding Clausewitz – A New Approach to On War* (Lawrence, Kansas: University Press of Kansas, 2008), 185.

[23] Coram, 332. Coram's biography details this "aha" moment for Boyd perfectly. "He [Boyd] began reading passages and explaining two crucial differences between von Clausewitz and Sun Tzu. First, von Clausewitz wants to bring the enemy to a big "decisive battle," while Sun Tzu wants to unravel the enemy before a battle. Put another way, von Clausewitz believes wars are decided by set piece battles more than by strategy, deception, and guerrillalike tactics. This means that even if he wins, there is a bloodbath. Boyd said von Clausewitz's second major flaw is that he spends a lot of time talking about how a commander must minimize "friction"—that is, the uncertainty or chance that always appear in the "fog of war." He does not deal with maximizing the enemy's friction—as does Sun Tzu—but only with minimizing his own. As Boyd said to Spinney, "Sun Tzu tried to drive his adversary bananas while Clausewitz tried to keep himself from being driven bananas."

[24] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (New York: Oxford University Press, 1963), 77.

[25] Ibid., 78*.*

[26] Ibid., 9.

[27] Ibid., 39-41.

[28] Coram, 325.; Chester W. Richards, e-mail message to author, February 10, 2013.; Franklin C. Spinney, e-mail message to author, February 10, 2013.

[29] *Stanford Encyclopedia of Philosophy, The Uncertainty Principle*, http://plato.stanford.edu/entries/qt-uncertainty/ (accessed March 6, 2013).

[30] John R. Boyd, "Destruction and Creation," September 3,1976, http://goalsys.com/books/documents/DESTRUCTION_AND_CREATION.pdf (accessed March 6, 2013).

[31] Frans Osinga, *Science, Strategy, and War – The Strategic Theory of John Boyd* (The Netherlands: Eburon Academic Publishers, 2005), 238.

[32] Franklin C. Spinney, e-mail message to author, February 10, 2013.

[33] John R. Boyd, "Patterns of Conflict," briefing slides edited by Chet Richards and Chuck Spinney, January, 2007, http://www.dnipogo.org/boyd/patterns_ppt.pdf, (accessed March 6, 2013).; John R. Boyd, "The Strategic Game of ? and ?," briefing slides edited by Chet Richards and Chuck Spinney, January, 2007, http://www.dnipogo.org/boyd/strategic_game.pdf, (accessed March 6, 2013).

[34] Coram, 335.

[35] General Martin E. Dempsey, *Mission Command*, White Paper (Washington, DC: Chairman, U.S. Joint Chiefs of Staff, April 3, 2012), 3.

[36] John R. Boyd, "The Strategic Game of ? and ?," briefing slides edited by Chet Richards and Chuck Spinney, January, 2007, http://www.dnipogo.org/boyd/organic_design.pdf, (accessed March 6, 2013).

[37] Ibid.

[38] Ibid.

[39] Chester W. Richards, e-mail to author, October 22, 2012.

[40] Of note, if familiarity of the OODA loop begins early in a service member's career, it can be more easily embraced at higher education levels.

[41] Specific frameworks and models presented by the US Army War College include strategic thinking, creative thinking, critical thinking, and systems thinking, etc.

[42] Malcolm Gladwell, *Blink* (New York, NY: Back Bay Books / Little, Brown and Company, January 2005), Kindle e-book

[43] Ibid.,

[44] Roper and Vandergriff, 20.

[45] Chester W. Richards, e-mail to author, October 17, 2012.

[46] Guy Claxton, *Hare Brain, Tortoise Mind* (New York, NY: Harper Collins, 2000), 4.

[47] Ibid., 6.

[48] Ibid., 148.