

# The ESSENTIAL BOYD

Grant T. Hammond

## INTRODUCTION

Col. John R. Boyd, USAF (ret.) died in West Palm Beach, Florida on Sunday, 9 March 1997. Col. Boyd had served as an enlisted man from 1945 to 1947 in the Army Air Corps and as an officer in the US Air Force from 8 July 1951 to 31 August 1975. He was seventy years old. Col. Boyd had been ill with cancer for some time. His contributions to the Air Force and the nation were significant. His death was the occasion for an unusual outpouring of sentiments from a number of sources. *The New York Times*; James Fallows, Editor of *US News and World Report*; retired Army Colonel David Hackworth; and Senator Charles Grassley (R, Iowa), among others, all praised Boyd and his accomplishments and wrote glowing tributes to him upon his death.

Among the most heartfelt tributes was written to the Editor of *Inside the Pentagon* by General Charles C. Krulak, Commandant of the US Marine Corps. I reproduce it here in its entirety so readers may get some sense of the regard in which Boyd was held by those who knew both him, and his ideas, well.

11 March 1997

To the Editor:

I was deeply saddened to learn of the passing of Colonel John Boyd, USAF (Ret). How does one begin to pay homage to a warrior like John Boyd? He was a towering intellect who made unsurpassed contributions to the American art of war. Indeed, he was one of the central architects in the reform of military thought which swept the services, and in particular the Marine Corps, in the 1980's. From John Boyd we learned about competitive decision making on the battlefield—compressing time, using time as an ally. Thousands of officers in all our services knew John Boyd by his work on what was to be known as the Boyd Cycle or OODA Loop. His writings and his lectures had a fundamental impact on the curriculum of virtually every professional military education program in the United States—and on many abroad. In this way, he touched so many lives, many of them destined to ascend to the highest levels of military and civilian leadership.

Those of us who knew John Boyd the man knew him as a man of character and integrity. His life and values were shaped by a selfless dedication to Country and Service, by the crucible of war, and by an unrelenting love of study. He was the quintessential soldier-scholar—a man whose jovial, outgoing exterior belied the vastness of his knowledge and the power of his intellect. I was in awe of him, not just for the potential of his future contributions but for what he stood for as an officer, a citizen, and as a man.

As I write this, my mind wanders back to that morning in February, 1991, when the military might of the United States sliced violently into the Iraqi positions in Kuwait. Bludgeoned from the air nearly round the clock for six weeks, paralyzed by the speed and ferocity of the attack. The Iraqi army collapsed morally and intellectually under the onslaught of American and Coalition forces. John Boyd was an architect of that victory as surely as if he'd commanded a fighter wing or a maneuver division in the desert. His thinking, his theories, his larger than life influence, were there with us in Desert Storm. He must have been proud of what his efforts wrought.

So, how does one pay homage to a man like John Boyd? Perhaps best by remembering that Colonel Boyd never sought the acclaim won him by his thinking. He only wanted to make a difference in the next war ... and he did. That ancient book of wisdom—Proverbs—sums up John's contribution to his nation: "A wise man is strong, and a man of knowledge adds to his strength; for by wise guidance you will wage your war, and there is victory in a multitude of counselors."\* I, and his Corps of Marines, will miss our counselor terribly.

Sincerely,

\* Proverbs 24:5-6

C.C. Krulak General,  
U. S. Marine Corps  
Commandant of the Marine Corps<sup>1</sup>

There are no honorary Marines. That is a title that has to be earned. But if there were such, one suspects John Boyd is at the head of the line. Why was he so honored by the US Marines and virtually neglected at his death by the US Air Force? What follows is a very rough sketch of Col. Boyd, some of his accomplishments and some of the more important concepts. They are only the barest essentials regarding both Boyd and his ideas and are woefully incomplete. They can give only the briefest insight into his thinking and accomplishments but do provide some insight into the question above.

#### **BOYD: THE MAN**

A fighter pilot of legendary skill, Boyd helped develop the programs and tactics used by most fighter pilots today. His "Aerial Attack Study" of 1960 and its maneuver-counter-maneuver, tactic-counter tactics approach to aerial combat was a major contribution to air-to-air combat. Boyd helped to create the Fighter Weapons School at Nellis AFB, Nevada. While there from 1954-1960, he was nicknamed "Forty Second Boyd." He had a standing offer to any pilot that he could outmaneuver an opponent on his tail and be in position to shoot him down in 40 seconds or he would pay forty bucks. In six years and over 3,000 hours of combat training, he never lost the bet. And he usually won in 10 seconds.

He, more than any other individual, was responsible for the development and design of both the F-15 "Eagle" and, as leader of the so-called "Fighter Mafia," the F-16 "Fighting Falcon." He, along with civilian mathematician Thomas Christie, was the creator of the "Energy Maneuverability Theory" and its later refinements that provided a way to compare airplane maneuverability and provide better designs to insure better performance. He was the person who coined the term and developed the concept of the "OODA Loop," (Observation, Orientation, Decision, Action), originally called the "Boyd Cycle" now so prevalent in both the US military and American business.

During his career in the USAF, Col. Boyd served in both Korea and South East Asia. Indeed, his military career spans the three decades from the fall of Berlin to the fall of Saigon. His Air Force service was essentially coterminous with the Cold War and he and the USAF grew up together. He received numerous USAF awards. He was awarded the Legion of Merit four times, the Air Force Systems Command Scientific Achievement Award, and the USAF Research and Development Award. He was also awarded the Air Force Association Citation of Honor, the Arnold Society Hoyt S. Vandenburg Award, and the Dr. Harold Brown Award all for his work in energy maneuverability, fighter design and air-to-air tactics. After retirement, he remained as a consultant to OSD for one day's pay a pay period. He wanted to live on a retired colonel's pay and work for free but had to be paid to maintain a security clearance and routine access to the building.

Unbeknown to most, led the Military Reform Movement of the late '70s and early '80s from inside the Pentagon. His quest for better thinking, an improved procurement system, and weapons selected on the basis of realistic testing were not popular. He was watched carefully and his phones tapped. He had friends in high places, regularly bucked the system and was therefore seen as a threat by many.

Boyd's famous briefings, "Patterns of Conflict" and "A Discourse on Winning and Losing," were given to many inside and outside the Pentagon including senior military leaders in all services and on Capitol Hill. Boyd was well known to a group of important people. They included former Secretaries of Defense and Congressmen Les Aspin and Dick Cheney, General Al Gray, former Commandant of the US Marine Corps, and General Edward C. Meyer, former Chief of Staff of the US Army. They also included former Senator Sam Nunn, Chairman of the Senate Armed Services Committee, Speaker of the House Newt Gingrich, and most of the influential media types in Washington and New York. Boyd had briefed all of them—several times—on his theories. Over the years, Col. Boyd frequently briefed a wide array of others on his ideas as well. These included Army officers at the Command and General Staff College in Ft. Leavenworth, KS; Navy pilots at Cecil Field in Jacksonville; Marines going through the tactics course at Quantico, Washington and most recently students at the Air War College and Air Command and Staff College at Maxwell, AFB. They also included The Institute for Advanced Study at Princeton, the President's Scientific Advisory Board, and various think tanks in Washington, DC. His ideas and briefings were a major influence on the US Marine Corps and served as the inspiration for FMFM 1, "Warfighting." They were also a part of the major rethinking of Army doctrine that led to the concept of "AirLand Battle" and further refinements in it. Perhaps most importantly, Boyd was instrumental in explaining and disseminating the concept of "cycle time" and "getting inside the adversary's decision cycle" which figured so prominently in the Gulf War.

Though he never published anything outside technical studies for the USAF, Boyd and his ideas have been profiled in a wide array of publications. Articles about him and his ideas are found in *Forbes*, *Fortune*, *Time* and *The Economist*, as well as numerous newspaper articles in *The New York Times*, *The Washington Post*, *The Dallas Morning News*, *The Los Angeles Times* and others. Over the years, Boyd's ideas have penetrated not only other military services but the business community and academia both here and abroad. Scores of books mention Boyd in a variety of roles. Articles about him and his ideas have appeared in South Korea and Hong Kong. Graduate students in Canada in military history study his ideas as do Danish students in business school in Copenhagen. Officers in the US Marine Corps and in air forces around the world and businessmen in companies as diverse as electronics and shipping all use Boyd's theories.

Boyd gave his two most famous briefings, which began as one hour long and grew to fifteen hour briefings over two days, over 1,500 times. There are literally thousands of copies of the 327-slide magnum opus "A Discourse on Winning and Losing" which he gave away and which have in turn been copied by others. Many of the ideas, words and phrases in Boyd's briefings have found their way into numerous doctrinal statements and joint publications. All the services use the OODA Loop as a standard description of decision making cycles. John Fialka of *The Wall Street Journal* summarizes Boyd's impact as follows:

Like the rain coming in through a leaky roof, Boyd's ideas thoroughly penetrated the winning strategy of the U. S. forces during the Gulf War, which was based on speed, maneuver and stealth. Later, generals and admirals borrowed liberally from Boyd's unpublished "Discourse on Wining and Losing" to explain their theories on information warfare. Some of them even passed off Boyd's ideas as their own.<sup>2</sup>

That didn't bother Boyd. He gave away good ideas and didn't care who took credit for them. It was the bad ones he wanted to root out.

The concepts of shaping the strategic environment, adaptation to the fluidity of the modern battlefield,

coping with uncertainty, using time as an ally, using more rapid OODA Loop cycles to degrade an adversary's ability to cope are now virtually routine. His calls for innovation and empathy (not normally seen as skills of warfighters), leveraging asymmetries, the importance of trust and teamwork, the necessity for considering moral factors are no longer seen as strange. Nor are the need for nonlinear thinking, the emphasis on such elements as awareness, the commander's intent, information, and the quality of leadership. All are enshrined in the *Concept for Future Joint Operations* (May 1997) and numerous other DOD and service publications.<sup>3</sup> Many are to be found in the new AFDD-1 as well. Though not unique to him, Boyd made consideration of them routine for an important period in the evolution of the American military.

Strangely, most officers in the USAF are unaware of him and his contributions. As an Air Force officer, you would know of John Boyd only in limited ways. You might have heard him lecture at the US Air Force Academy twenty years ago. You may have taken certain electives at the Air War College. Or, you may have run into one of his contemporaries or protégés, or studied the development and procurement of the F-15 and F-16. If you haven't done those things, you are unlikely to have heard of John Boyd. Part of that is a factor of time and different generations. Part of it is because John Boyd made as many enemies as friends in his career. He was anathema to the USAF leadership in that he did things his way, went outside the chain of command, leaked things to the press, and was concerned more about the quality of ideas than the rank of those he offended. Because the USAF was focused on acquiring as many F-15s as possible, the senior leadership did not want the F-16 and without John Boyd, it wouldn't have existed. The F-16 is the backbone of the USAF in terms of numbers, the last fighter likely to be produced in the thousands, flown by 20 countries, and is the only American fighter ever to cost less than its predecessor. Despite all that, John Boyd has not been forgiven for his successful efforts to create it.

But it is his ideas that are most important and which, while limited in distribution, have come to be important to many concerned with strategy and military history. He had a different approach and raised lots of questions. In doing so, he committed his greatest sin—consistently challenging orthodoxy. He relished doing so and others either believed him or hated him in the process. He is simultaneously regarded as one of the greatest military minds of the 20<sup>th</sup> century and as a crackpot, as a great pilot and a "one trick pony," as a threat to the nation and one of its greatest unsung heroes. The reality lies somewhere between those extremes. What follows is an effort to impart some of Boyd's notions about strategy, tactics, military history, and how organisms and organizations go about trying to survive and prosper.

### **BOYD: THE IDEAS**

Though an airman, Boyd was not an airpower theorist and in fact was little concerned about how to design an air campaign or a strictly air war. Boyd's concern was the nature of human conflict, the strategy and "grand tactics" writ large, not particular service approaches *per se*. He jumped from the tactical experience of air-to-air combat and proceeded to think about how to conduct different types of wars. His contributions lie in strategic thinking. That said, if we were to attempt to summarize the essence of Boyd's thought, what are the most important elements, injunctions, and insights to be gained? What of this can be applied to airpower? Boyd himself would dislike the exercise because it would smack of a recipe and violates his notion of learning because I will tell you rather than have you figure it out for yourselves. These ideas should be developed and occur naturally. It is a poor imitation of the reality of learning and may give misleading directions to what is a random, non-linear process.

A neo-Darwinian of the first rank, scientifically, not socially, Boyd begins with the premise that the business of life is life. Life cannot be lived unless the organism survives. It can be lived better if it prospers. Hence, all organisms' first priority is to survive and prosper. This is best done by acting in such a manner that you can provide for your own sustenance independently of others. You cannot control their actions, motives, and performance. Self-reliance is better than alliance. This being the case, the chief aim of an organism that

seeks to survive and prosper is to achieve and maintain its independence, its freedom of action. There are times, however, when this is neither possible nor desirable. Some symbiotic relationships are prudent if not mandatory. In some cases, existence itself is dependent on such a relationship and at that point, since survival is the highest goal, it is a necessary element of continued life.

But how, pray tell, does one go about doing this? How do organisms preserve freedom of action and prosper? By what means do they insure their freedom of action? Boyd's answers are several. First, they have to be very observant and aware of the environment in which they find themselves. You can be the largest organism, the most adaptable life form, the most self-sufficient country, the wealthiest and most successful corporation, the most talented football team, the most capable military—and lose a contest with an opponent. How? By misreading the environment. All the resources, plans and objectives will not readily translate into victory if you do not understand the environment in which the conflict will occur and its impact on the outcome. *Knowledge of the strategic environment is the first priority.*

The secondly, one must be able to interact with the environment and those within it appropriately. You must be able to observe and orient yourself in such a way that you can indeed survive and prosper by shaping the environment where possible to your own ends, by adapting to it where you must. Doing so requires a complex set of relationships that involve both isolation and interaction. Knowing when each is appropriate is critical to your success. In OODA Loop fashion, one must continually observe, orient, decide and act in order to achieve and maintain freedom of action and maximize the chances for survival and prosperity. *One does so through a combination of rapidity, variety, harmony, and initiative.* It is these that are the core of "Boyd's Way." Rapidity of action or reaction is required to maintain or regain initiative. Variety is required so one is not predictable, so there is no pattern recognition for a foe to allow him to know of your actions in advance and thus plan to defeat them. Harmony is the fit with the environment and others operating in it. Initiative—taking charge of your own destiny—is required if one is to master circumstances rather than be mastered by them.

Central to understanding the world about you and how best to perform in it is the notion of defining the environment as a composite of *mind-time-space*. This is a vastly different way of looking at the world than that with which most of us are comfortable. It is three dimensional, whereas our conceptions, if not our sight, are generally only two-dimensional. We understand that things happen in time and space and we are used to measuring both routinely in matters both pedestrian and cosmic in their significance. For physicists, theoretical mathematicians, and others used to dealing with four and more dimensions, the two dimensional construct of time and space are rather drab and simple in comparison. Boyd's view of the cosmos is elegantly simple and yet reveals a dimension of complexity unknown to most. Boyd's concept of the environment, of how conflict is played out is contains not only time and space, but the *mind* of the opponent. Indeed, his perceptions are the key to winning and losing.

To reconstruct Boyd's cosmos, there are only three elements in it: matter, energy and information. These exist in space, time, and the mind of those sensing the environment. Many strategists have belabored the spatial aspects of battles, campaigns and wars. Some have even dabbled in the temporal aspects as well. A few have worried about what the adversary values and how he sees the world. None have devised a strategic outlook so consistently attuned to all these dimensions simultaneously as has Boyd. Boyd merges Sun Tzu, Clausewitz, B. H. Liddell Hart and others into a comprehensive appreciation of a mind-time-space continuum within which wars are fought. It is this grand synthesis that makes his understanding of conflict and war so comprehensive, so insightful and so skillful.

There is another trinity in Boyd's strategic catechism as well. It is a concern for what he lumps together as *moral-mental-physical* aspects of opponents. Most definitions of war define them as contests in physical violence. Boyd sees them mainly as moral struggles won as much by mental as physical prowess. But he

sees the complex—moral-mental-physical—as a single entity, a synthesis that can be broken down analytically but must be understood as a composite whole. It matches another Trinitarian composite, that of *people first, ideas, second and things third*. This happens to be the opposite of the way most militaries approach problem solving by focusing on technology, platforms and weaponry first, ideas about their employment second and people—who are largely interchangeable and ultimately, are expendable—third. This way of thinking has little utility in Boyd's Way and in fact, may be the seed of many a defeat.

Wars are begun, fought and ended for some moral purpose, some better state of peace than either the *status quo ante bellum* or the horrors and suffering that war causes to achieve this new "peace." The end—peace—must be worthy of the horrendous means—war—by which it is achieved. If not, we have an unjust war and an untenable position as well as needless sacrifices of blood and treasure. In Boyd's world, both personal and abstract, *morality plays a central role*. Failure to understand that brings ruin in the long run. Neither individuals nor societies can ignore, discount, or overlook moral considerations in the long run. Moral values provide a set of higher goals and standards that enable us to confront mistrust, uncertainty and menacing circumstances with confidence and courage. Without them, we are likely to be overcome by fear, anxiety and alienation and defeated in our endeavors. Something more than quantitative or even qualitative superiority on the battlefield is necessary to win in the larger context of things. And without a concern for the moral as well as the mental and physical aspects of conflict, we deceive ourselves and never really "win."

Hence, for Boyd, the concept of moral leverage is critical to one's strategy of conflict. Without an understanding of how to minimize our friction and increase that of our adversary in a moral-mental-physical sense, we are not likely to be victorious and hence, survive and prosper. People must believe in the cause that they fight for, must affirm what it is they stand and die for, must seek to live for some higher good or goal than merely themselves. Knowing merely what they are against, the negative motivation of hate, revenge or retribution is insufficient to galvanize a society to win a compelling victory and institute a lasting peace. Such notions may be far removed from the considerations of many, but Boyd is philosopher as well as a tactician, a strategist with a conscience, whose view of conflict and war makes room for, indeed could not exist without, concern for *moral leverage as well as physical force*.

Life—that process of seeking harmony with one's environment, growing, interacting with others, adapting, isolating oneself when necessary, winning, siring offspring, losing, contributing what one can, learning, and ultimately dying—is for Boyd reducible to a series of OODA Loops. In the OODA Loop process lie all the elements of life itself stripped to their barest essentials—*observe, orient, decide and act*. Repeat as long as possible, as best you are able, as fast as you can when you compete with others, as slowly as necessary otherwise. In that acronym are contained all the trials, victories, and defeats that life entails. But how do we survive and prosper?

Boyd's answer is that we should be open to possibilities, to opportunities and ready and able to recognize choices and make them. *It is all a matter of connections and choices*. The more we know, the more we connect—to the environment, to the past, the future, to people, to ideas, and to things. In doing so, we have to make choices, to prioritize, to do trade-off thinking about options and possibilities. We also have to embrace novelty, to synthesize, to create opportunities out of the things around us, to be the architect of our own life in so far as possible. For Boyd, living is thinking and creating through endless OODA Loops of various sizes, speeds, and importance.

### **BOYD: THE STRATEGY**

Boyd's strategic catechism is based on the notions of *variety, rapidity, harmony and initiative*. More familiar terms for these same concepts can be adduced from lists of principles of war. They would be characterized as supporting notions such as Simplicity, Maneuver, and Surprise. All of course, would be focused on

attaining the specified Objective that is implicit in this discussion. Furthermore, Boyd would have us remember that we should be concerned with the moral and mental aspects as well as the physical. The latter may be the easiest part of the equation in the long run. Paying attention to these aspects of the competition means that we must play the competitive game in the mind-space-time framework.

As stated before, *the central aspect of Boyd's strategic thought is time*. Time is as important or more important than space to Boyd. The key aspects to his strategic thought—variety, rapidity, harmony and initiative—are all linked to his notion of competition in time. There is a variety to do through time, the rapidity of actions in time, the harmony of time and space and the notion of taking the initiative in time. Time is a free good. It does not have to be transported, sustained and protected as do other elements of warfighting. It simply exists. How one uses other things to impact on the adversary's consideration of it can be all-important, however. Increasingly, business, information services, and militaries agree with Boyd that being time competitive is critical to success. Often, doing things at the right time is more important than doing them at the right place.

*Ambiguity* is central to Boyd's vision. It is not something to be feared but something that is a given. Being creative organisms, we should welcome it and make use of it. The world is ambiguous. It is uncertain and unknowable in detail when we must decide what to do. We never have complete and perfect information. We are never completely sure of the consequences of our actions. Our decisions and actions are hypotheses to be tested against this ambiguous environment. The best way to succeed in it is to revel in ambiguity. Rather than fight against it and attempt to learn or know all, we should accept it and use it to our advantage. We do so by adapting to the circumstances around us and perfecting our ability to deal with incomplete information. Though anchored in moral conviction, we should remain fluid in our actions, being unpredictable and adaptable to unfolding circumstances.

Ambiguity is part of a good defense. If one becomes predictable, then there is a pattern to his actions. If there is a pattern, that can be recognized. Intelligence is about pattern recognition. If one has a pattern to his actions, he is predictable. And if you are predictable, you are capable of being defeated. Thus promoting ambiguity as well as learning how to cope with it are both part of Boyd's framework.

Developing an effective strategy requires great skill in combining simple truths and fundamental insights. Among these are the need to guard against entropy. One does so by maintaining the *initiative, growing continuously and constantly adapting*. For Boyd, entropy is a constant threat. It can be physical, mental or moral. It can deny you the initiative. If you keep the initiative, you are always on the offensive. If you lose it, then you become defensive. You need to remain open-minded and flexible. The greatest danger is to get captured by your own thought processes rather than remaining sensitive to the changing environment and your opponent. Re-examine your thoughts and assumptions, your purposes and the means to achieve them.

To win, you need to *get inside the adversary's OODA Loop*. You can either go through the OODA Loop cycle faster than your opponent or you can vary your tempos and rhythms so your opponent cannot keep up with you. Doing so is a means to gain leverage over your opponent and preventing him from gaining leverage over you. You do this by reducing your exposure time and friction and increasing both of those for your opponent. Getting inside the opponent's OODA Loop requires that you remain fluid, that like water, you follow the path of least resistance, flow through the environment and use strength against weakness. Change your speed and patterns of behavior so that he is unbalanced by them. Be menacing and threaten what your opponent values most. Protect what you, and your allies, value most. All forces have flanks. Target and attack your opponents exposed flanks. Search for the mismatches, the opportunities to take advantage of and exploit these to the fullest.

Doing so requires one to follow Sun Tzu's injunctions to know your enemy and know yourself. You must also understand the conflict, have situational awareness and properly define the strategic problems for both you

and your enemy. *The real target is always your enemy's perception.* As Boyd said in an interview: "Machines don't fight wars. Terrain doesn't fight wars. Humans fight wars. You must get into the minds of humans. That's where the battles are won."<sup>4</sup> To target that accurately you must know the enemy people and culture as well as their leadership and government. You must know and understand the enemy's values and aspirations. Ultimately you must understand how the enemy society thinks, what their score card is. They decide when they are defeated, not you. Hence their perceptions are critical to winning.

*Effective strategy works on three levels—moral, mental and physical.* We are at risk to others physically. But, according to Boyd, we defeat ourselves mentally and morally when we let ourselves become mentally confused or weaken our moral standards. Integrity really is central. Moral conviction is a necessity. The greatest danger and the easiest way to lose is to lose the trust that is the basis for social cohesion.

The moral fabric of society unravels if there is no trust. With trust, you gain respect, loyalty, and common purpose. Without trust, you need detailed orders to run things. All centralized command and control systems are based on mistrust. The way to maintain moral authority is by deed, not word alone.<sup>5</sup>

If we fail to match word and deed, we have created a flaw in our system, a mismatch that an enemy can exploit. That mismatch can generate uncertainty and mistrust and generate entropy. When entropy is generated in your system, you undermine yourself and the enemy merely has to take advantage of your own self-induced weakness.

The real basis for the moral strength of a system and what keeps it functioning smoothly are the unstated agreements that are shared by all. *In short, trust is essential.* In a harmonious system, orders and communications should be at a minimum. The best way to insure that an organization runs smoothly is to make sure everyone understands and is attuned to the organization's purpose, or "the commander's intent" in a military operation. Then give them the freedom to do what needs to be done, to be creative and to adapt as necessary in accomplishing the mission. Having such an organization requires that you choose people well and that you know them and have trained them appropriately. Then allow them to utilize their initiative. If they can't, won't, or fail in the attempt, release them quickly and find those who can. It is only by relying on "mission type orders" and *auftragstaktik* that you can establish both the trust and flexibility that is required and avoid detailed orders and supervision. If you have the latter, you cannot act fast and adapt quickly. To insure that the system is working as intended and can adapt, you have to let bad news travel up.

## **BOYD: ADAPTATION AND WARFIGHTING**

For a guy who was heavily into mathematics, Newton's calculus, quantum mechanics, the physics of subatomic particles, aerodynamics, chaos theory and non-linearity, it took awhile to become knowledgeable about and comfortable with biology and its modern findings and implications. But Boyd had always had a fascination with evolution and natural selection. He had read both Darwin and Wallace and routinely read things such as Richard Dawkins, *The Selfish Gene*, E. O. Wilson, *Sociobiology* and a host of related materials over the years. He had just not taken the time to integrate these scientific aspects of his cosmology as completely and thoroughly as he had other elements of it. That began to change after he moved to Florida. Perhaps concern for his health was a spur to find out more about life and its mysteries. Perhaps things had just ripened and matured in his mind to the point where he was both willing and able to integrate things in a different way. Whatever the reason, his concern for the organic, for biological metaphors, for evolution and its richness and spontaneity were all central to his concerns in his reading and thought.

It was not that biological approaches were not already central to Boyd. They were. *He thought organically,*

*not mechanically.* And, despite his time spent in aeronautical engineering activities while working on to F-15 and F-16, he did so within an environment which was a laboratory for learning about the survival the fittest—the Pentagon and the wider world of Washington politics concerning national security issues. Hence, there developed this rather strange amalgam. It consisted of mathematically precise physical relationships and the human dimension of willful choice juxtaposed against the natural environment of chance and randomness, the evolution of ideas and opportunities and the both natural and unnatural selection of concepts, programs, weapons systems, etc., as the evidence of choice at work. And as one considered such questions as the age of the universe, the nature of space and time, differing cosmologies and such in the scientific literature of the period, the time scale for thinking about evolution and organisms ability to survive and prosper lengthened considerably too. Boyd's reading and thinking changed in emphasis as he attempted to blend new insights into his appreciation of the ideas and concepts that he had worked with for so long.

The essence of Boyd's Way and its purpose is about making choices for successful evolution—*how organisms behave in order to survive and prosper.* Doing so is absolutely dependent on the OODA Loop cycle and the correct "read" of the strategic environment in which the organism exists. Observation, orientation, decision, action cycles repeated billions of times is a description of the evolution of all life forms on the planet. Boyd merely changed his temporal lens from a microscope to a telescope, from a micro setting to a macro one, from seconds to eons, from an organism to life forms and became more comfortable jumping back and forth from one to the other. Reading in the field showed that that was how the advances in understanding itself were also made—synthesis and extensions from insights into the functions of a single cell to the symbiotic relationship that species might develop with each other over millennia. Evolution—the process of adaptation—became very exciting and another area of corroboration for the set of intuitions and proofs that constituted Boyd's Way.

But the key to success, to progress, to successful, creative adaptation is *to find and revel in the mismatches.* Without the mismatches, the "disconnects," as the military says, there would be no spur to find a solution, to make improvements, to interact with our environment creatively. To do so effectively, we must destroy before we can create. Boyd's essay on "Destruction and Creation" is a description of what we do as we grow, learn and do. Without this process, closely linked to analysis and synthesis, how we think, and our ability to adapt creatively, we could not survive and prosper. It is a simple statement of a complex process.

Ultimately, what Boyd is all about is a way of thinking and the creation of an organism or organization that is capable of rapidity, variety, harmony and initiative. In other words, *he seeks to create organizations and organisms that are adaptive.* Only in this way can they hope to survive and prosper in the face of complex change and uncertainty. The most comprehensive application of Boyd to date is to be found in FMFM-1, the US Marine Corps manual entitled. Conceived by Commandant of the Marine Corps, General Albert M. Gray, the manual was largely written by Col. John F. Schmitt. Gray minces no words in his accompanying forward.

I expect every officer to read—and reread—this book, understand it and take its message to heart. The thoughts contained here represent not just the guidance for actions in combat, but a way of thinking in general. This manual thus describes a philosophy for action which, in war and peace, in the field and in the rear, dictates our approach to duty.<sup>6</sup>

It is a synthesis for the Marine Corps of Clausewitz, Sun Tzu, Liddell Hart, Napoleon, Patton, and most especially and prominently, John Boyd. "Warfighting" is the essay Boyd should have written if he had only written in prose instead of giving briefings.

The synthesis that FMFM-1 represents rests largely on the one that Boyd created. And Boyd is cited in the manual for his ideas. There are parts of it which are virtually verbatim from Boyd's presentations. On

uncertainty: "The very nature of war makes absolute certainty impossible; all actions in war will be based on incomplete, inaccurate, or even contradictory information."<sup>7</sup> On maneuver warfare:

The goal is the application of strength against selected enemy weakness. By definition, maneuver relies on speed and surprise, for without either, we cannot concentrate strength against enemy weakness. Tempo itself is a weapon—often the most important. The need for speed in turn requires decentralized control. While attrition operates principally in the physical realm of war, the results of maneuver are both physical and moral. The object of maneuver is not so much to destroy physically as it is to shatter the enemy's cohesion, organization, command, and psychological balance.<sup>8</sup>

On trust: "Consequently, trust is an essential trait among leaders—trust by seniors in the abilities of their subordinates and by juniors in the competence and support of their seniors."<sup>9</sup>

The use of certain terms throughout the pamphlet—fluidity, shaping the battle, intuition, harmony, decision making cycles, the moral aspects of war, dispersion and concentration, the importance of trust, increasing the adversary's friction, promoting uncertainty and disorder, decentralizing decision making—are all Boydian. Chapter 4 on the "Conduct of War," particularly the sections on "Maneuver Warfare" and the one on "Decision Making" are tightly woven syntheses of Boyd's more rambling briefings. Indeed, the very definition of maneuver warfare is Boyd's preferred vision of how wars should be fought. "Maneuver warfare is a warfighting philosophy that seeks to shatter the enemy's cohesion through a series of rapid, violent, and unexpected actions which create a turbulent and rapidly deteriorating situation with which he cannot cope."<sup>10</sup>

There are other portions that are beautifully written syntheses of Boyd's Way. The introductory section to the last chapter, "The Conduct of War," is entitled "The Challenge." Despite the length of the section, it is useful to cite it in full.

The challenge is to identify and adopt a concept of warfighting consistent with our understanding of the nature and theory of war and the realities of the modern battlefield. What exactly does this require? It requires a concept of warfighting that will function effectively in an uncertain, chaotic, and fluid environment—in fact one that will exploit these conditions to advantage. It requires a concept that, recognizing the time-competitive rhythm of war, generates and exploits superior tempo and velocity. It requires a concept that is consistently effective across the full spectrum of conflict, because we cannot attempt to change our basic doctrine from situation to situation and expect to be proficient. It requires a concept which recognizes and exploits the fleeting opportunities which naturally occur in war. It requires a concept, which takes into account the moral as well as physical forces of war, because we have already concluded that the moral force form the greater part of war. It requires a concept with which we can succeed against a numerically superior foe, because we can no longer presume a numerical advantage. And, especially in expeditionary situations in which public support for military action may be tepid and short-lived, it requires a concept with which we can win quickly against a larger foe on his home soil, with minimal casualties and limited external support.<sup>11</sup>

I submit we have that concept, for this is in effect a summary of what Boyd was able to do in his "Discourse on Winning and Losing."

## **CONCLUSIONS**

In 1992 Boyd was asked to participate in the CSAF sponsored study on *SPACECAST 2020*. He was listed among the captains of industry, scientists and serving and retired general officers on the Board of Advisors simply as "maverick thinker," a designation with which he readily concurred and of which he was very proud. It was 17 years after he retired and only the third time he had been to Maxwell since leaving Squadron Officer School in the 1950s. He lectured once on a Friday at 1400 in 1981 having been given two hours to do what he knew would take four. It was a disaster. He was not invited back until Col. Ray Bishop did so for an elective course in 1991. Thereafter, until cancer began to take its toll, Boyd was a regular visitor to SAAS, ACSC and the AWC, albeit in the latter case, only for special projects and electives, not for the core curriculum. Still, to some degree, he was "rehabilitated" within the Air Force.

John Boyd is dead but he has left a legacy about how to think about war and conflict that is useful, if abstract. It is an amalgam of the ideas of many others selected from throughout history and attempts a creative synthesis of insights from both science and technology on the one hand, philosophy and social science on the other. It is imperfect and incomplete. It was done over many years and never written in prose format. It did however infect a generation of senior military and political leaders with the virus of novelty and led them to think in different ways about the conduct of war. Much of what he attempted to do still exists, enshrined in service doctrine and certain Joint Publications. But much of this Boyd would find dangerously self-delusional. He never accepted the concept of synchronization as enshrined in Army doctrine. He would rail against the hubris of attaining perfect knowledge and information dominance amid the fog, friction, chance, and luck of war. If on active duty and alive today, Boyd would be developing the low cost alternative to the F-22, arguing against it as he had the F-15, which he helped to create, not on the basis of performance, but on the basis of cost. Most importantly, Boyd would be looking for other maverick thinkers, the people with unquestioned integrity and moral purpose, willing to challenge orthodoxy and committed to making the system more honest and capable than it is. He would urge those who would become senior leaders that one of their most important duties is to find those people and protect them. A true patriot, Boyd nonetheless led the charge to challenge much of our strategic thinking, doctrinal rigidity and lack of understanding about the art of war and the profession of arms. He was, oxymoron though it may be, a loyal heretic—and proud of it.

The US Marine Corps now houses all of John Boyd's books and papers in its Archives at the Research Center at Quantico, an offer it made to the family within 48 hours of his death. To date, there is no official memorial to Boyd in the US Air Force. His funeral at Arlington National Cemetery, with full military honors, had more members from the other services in attendance than those from the Air Force. That wasn't hard to do. With the exception of the Air Force Band and Honor Guard, there was only one three star general, the token representation from Boyd's service. He had no clue as to who Boyd was or what he had done. He was merely doing as ordered—attend the ceremony. Large numbers of civilians, a few officers from the Navy, and Army were present. So too were the Marines, in large numbers, one of whom laid his Globe and Anchor at the grave as a mark of the respect the Corps had for Boyd.

Friends worked hard to arrange a fly-over for the graveside service. Had it not been for the efforts of retired general officers that had flown with Boyd in Korea, it would not have been possible. A fly-over was dutifully arranged—for F-15s, not his beloved F-16. Alas, it didn't take place because of inclement weather. It is poetic irony that even in death, John Boyd has been misunderstood and denied much of the recognition he so richly deserved. To my knowledge, the only formal recognition of him even being considered at the moment, and that after and only in response to a Congressional inquiry, will be the possible naming of a building at the Fighter Weapons School at Nellis AFB in Boyd's honor. (Webmaster's note: Dr. Hammond recently added this update: It was September 17, 1999. In a small ceremony, a plaque (9" x11") was unveiled naming the Aggressor Squadron building at the Fighter Weapons School at Nellis in honor of Boyd. John would have liked the fact that it was the Aggressor Squadron building.) Within Air Force culture, being

"a good stick" and showing others how forty years ago has a greater value than learning about better thinking for the future. Several senior officers have explained that while Boyd was an important figure in the evolution of the US Air Force, public recognition would be difficult because he had dared to buck the system on so many occasions. The fact that he was right in his advice and counsel most of the time is seen as less important than the sin of challenging the orthodoxy of the senior leadership. As the French say, "*Plus ca change, plus c'est la meme chose*"—the more things change, the more they stay the same.

#### NOTES

\* The author is completing a book on John Boyd, his ideas, and impact entitled *The Mind of War: John Boyd and American Security*. Scheduled for publication in May 2001, it is the product of several years of research and interviews with military officers, businessmen, journalists, politicians and with Col. Boyd himself. [DNI editor's note: *The Mind of War* was published by the Smithsonian Institution Press, Washington, DC, in May 2001. It is available through [Amazon](#), [B&N](#), and most other on-line booksellers.]

The author readily admits a bias in favor of many of Col. Boyd's ideas, if not an endorsement of his methods. The views expressed here are those of the author and not those of the USAF. Dr. Hammond is the Director of the [Center for Strategy and Technology](#) at the Air War College.

1. Letter to the Editor, Gen. C. C. Krulak, *Inside the Pentagon*, March 23, 1997, p. 5.
2. John Fialka, *War By Other Means: Economic Espionage in America*, (New York: W. W. Norton, 1997), p. 197.
3. See Commander, Joint Warfighting Center, Ft. Monroe, VA., *Concept for Future Joint Operations: Expanding Joint Vision 2010*, May 1997.
4. John Boyd, quoted by Henry Eason, "New Theory Shoots Down Old War Ideas," *Atlanta Constitution*, March 22, 1981.
5. Interview with the author, November 13, 1993. For development of these ideas, and others alluded to in the text, see Col. John R. Boyd, USAF (Ret.), "A Discourse on Winning and Losing," unpublished briefing dated August, 1987.
6. U. S. Marine Corps, Quantico, VA, FMFM-1, *Warfighting*, 6 March 1989. p. 1.
7. *Ibid.*, p. 6.
8. *Ibid.*, p. 29.
9. *Ibid.*, p. 45.
10. *Ibid.*, p. 59.
11. *Ibid.*, pp. 57-58.

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