

Unclassified Paper

NAVAL WAR COLLEGE
Newport, R.I.

A FRESH LOOK AT SOME OLD PRINCIPLES--BUILDING A FRAMEWORK FOR
THE TWENTY-FIRST CENTURY.

By

David R. HEINZ
LtCol, USMC

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements for the Master of Arts Degree in National Security and Strategic Studies.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature:



17 May 1999

DTIC QUALITY INSPECTED 4

19991122 195

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Unclassified): A FRESH LOOK AT SOME OLD PRINCIPLES--BUILDING A FRAMEWORK FOR THE TWENTY-FIRST CENTURY.			
9. Personal Authors: David R. HEINZ, LtCol, USMC			
10. Type of Report: FINAL		11. Date of Report: 17 May 1999	
12. Page Count: 23			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: Network-Centric, Principles, Information, Warfare, Operations, Framework, Twenty-First, Dominant, Knowledge, Advantage.			
15. Abstract: Expanding on the initial themes as presented in the book, <u>The Principles of War For the Information Age</u> , by Robert R. Leonhard, this paper challenges the relevance and currency of the principles of war that were first penned during agrarian times and the beginning of the industrial age. It constructs a new framework based on the independent Law of Humanity and the dependent Laws of Risk, Adaptability, and Duality of War. It then presents the following new principles of War in the form of a dialectic: Comparative vs. Exclusive Advantage, Knowledge vs. Estimates, Confrontation vs. Dislocation, Concentration vs. Distribution, Reaction vs. Opportunity, Security vs. Activity, Objective vs. Option Acceleration, Anarchy vs. Command.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

Preface/Acknowledgements

This “project” began as an analysis of the requirements necessary to improve the military’s ability to prosecute moving targets on the battlefield. As the solution to that problem began to sound more like Network-Centric Warfare, I began to question some of the basic principles of war. From there, I progressed into looking at literature on Network-Centric Warfare, Information Warfare and Dominant Battlespace Knowledge. Using simple computer games, I began to gather some anecdotal evidence of the changes that knowledge has on the conduct of warfare. I started to build my own framework which included the basic tenets about the primacy of politics, risk, adaptation and advantage. Very late in the project, I came across the book, The Principles of War For The Information Age, by Robert R. Leonhard. The book had a significant impact on this paper. For me, the book provided clarity to many concepts that I had arrived at independently. The end result is that this paper has many parallels to the points in Leonhard’s book, but also many deviations.

It is a think piece, with the hope that it advances the knowledge provided by Leonhard. For the books intellectual direction and the challenge to question more than 75 years of military convention, I am grateful.

List of Illustrations

Figure 1. The What and How of Warfare	3
Figure 2. Politics and the Primacy of Mankind (Law of Humanity).....	7
Figure 3. The Three Dependant Laws based on the Law of Humanity.....	9
Figure 4. Characteristics of an Advantage.....	10
Figure 5. Comparative and Exclusive Advantage.....	11
Figure 6. Summary of Advantage	12
Figure 7. The Principle of Knowledge and Estimates.....	12
Figure 8. The Impact of Relatively Better Knowledge.....	14
Figure 9. The Complete Framework for the New Principles of War.....	18

Thesis

At the end of a presentation given to 200 members of the senior class of the United States Naval War College* on Network-Centric warfare, the lecturer asked the audience whether they would consider themselves skeptics, neutrals or enthusiasts of the new paradigm. The class was equally split between skeptics and neutrals with only 2 enthusiasts (up from 0 the previous time the lecturer polled the audience). Most would point to concerns regarding the feasibility and suitability of developing technology as the reason for their lack of enthusiasm. The real reason is more basic. It is the guttural response of a military professional to the premise that the principles of warfare that he knows and understands could be changing. The problem is, *they have already changed*. The 9 principles of war as studied during operational art and as encapsulated by the acronym MOUSE-MOSS are largely irrelevant and the planning process known as the Commanders Estimate of the Situation (CES) is outdated. Clinging to such dinosaurs has blinded us to the changes all around us, in industry, in economics and in politics--changes brought about by the information age. If we continue to fail to recognize these changes, we will oscillate around a few recognizable but obsolete alternatives we do comprehend until we ourselves are irrelevant.

Introduction

In order to make a valid argument for such a controversial thesis; the discussion must necessarily begin with some truths.

Truth #1	The purpose of military operations is political.
-----------------	---

* The premier institute preparing the Navy for future military operations in the information dominated environment of the twenty-first century.

This truth articulated by Clausewitz and thoroughly debated for the last century needs no additional arguments. The goal of war is to compel the enemy to capitulate to our terms.

We kill some in order to influence the others.

Truth #2	Wars are won by finding (or creating) and exploiting the vulnerabilities of the enemy while preventing him from doing the same to you.
-----------------	---

This truth stems from the concept of ADVANTAGE. Advantage can be achieved by several means: Positional (the basis of the principle of maneuver), Numerical (largest force ratio (the principle of mass), Temporal (which includes the principle of surprise and can be subdivided as duration, frequency, sequence and opportunity¹), Functional (render a capability dysfunctional--this is the basis of Air Superiority) and finally Moral. Others would also point to the advantages of training, technology, ideology and organization, however, while significant, these advantages are inherent within the fighting force and if the commander does not have them going into a battle, it is unlikely he will be able create them during a battle.

Truth #3	People adapt.
-----------------	----------------------

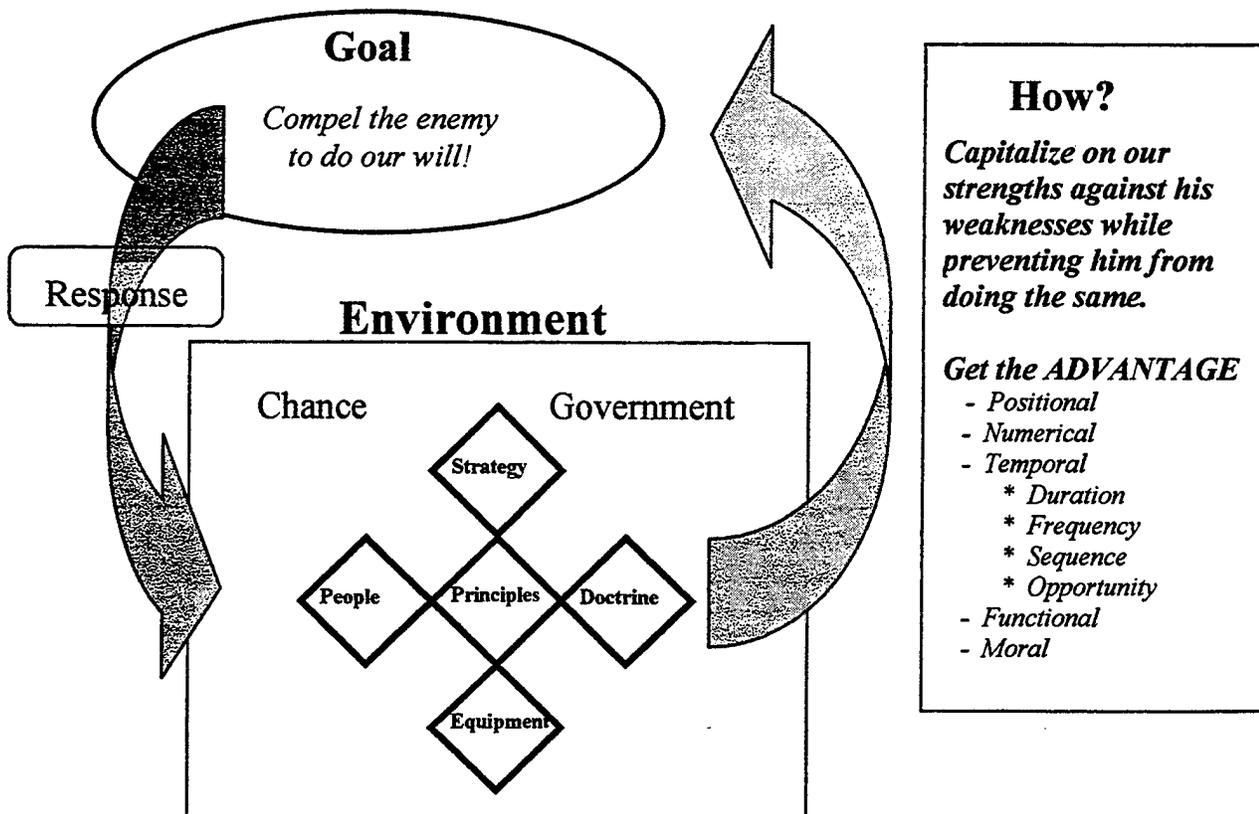
Human beings by their nature are adaptive. When being coerced, humans will seek alternatives--ways to counter the opponent's advantage.

Before advancing the next part of the argument, consider the following postulate:

Postulate #1	The battles of the future will be largely come as you are.
---------------------	---

Few would argue otherwise. Certainly in preparing for the next engagement, the postulate represents the least risky scenario. Assuming that the postulate is true, a commander must assume that he will fight with the people/training, equipment and doctrine he already has. The strategy that he chooses will be based on his best estimate of friendly strengths and weaknesses as they stake up to the enemy strengths and weaknesses. All of these things should be rooted in the principles of war. FM 100-5 says that the principles of war are the fundamental basis for successful operation across the full range of military operations providing “general guidance for the conduct of war at the strategic, operational and tactical levels” and that they are “the enduring bedrock of Army doctrine.” Therefore, one should be able to derive guidance about people, training, equipment and strategy from these principles. *The principles of war should be able to contribute to creating a better fighting force.* The arguments presented thus far are summarized with the figure below:

Figure 1. The What and How of Warfare



The figure shows the principles of war at the center of the fighting force indicating its importance. It also shows that the fighting force will also have external influences from Government (reinforcing the political nature of the conflict) and from the elements of chance. Therefore, let us examine the current principles of war to see how they guide us in future operations and how they incorporate the truths that have thus far been established.

The first attempts to reduce the principles governing the conduct of warfare to an instructional list can be found beginning in the time of Clausewitz and Jomini. J. F. C. Fuller was the first to pen a list of eight principles that were later revised to nine. This list, with mostly minor modifications became the first articulation of the principles of war and appeared as part of Army doctrine in 1921. These principles as specified in FM 100-5 can be summarized in two categories²:

CONVERGENCE	INTERACTION
- Mass (One point in space and time)	- Maneuver (one side dislocates the other)
- Objective (One purpose)	- Offensive (one side attacks the other)
- Unity of Command (One commander)	- Surprise (one side preempts the other)
- Simplicity (One idea of victory)	- Security (one side forestalls the other)
- Economy of Force (One effort--avoid waste)	

The convergence principles emanate from the concept of oneness. One commander with one objective and one idea of victory applies combat power at one point in space and time to achieve an advantage. The last principle--Economy of Force--advises the commander to avoid wasting resources on divergent activities, and that there is some optimal force size for the prosecution of the objective--a concept that runs counter to the principle of Mass. The

four principles under the category of interaction deal with the relationship of the friendly and enemy forces. They tell the commander that surprise is good but offense is better and that the offensive can be maintained by flexible application of combat power “to gain positional advantage” (Maneuver). Finally, don’t “permit the enemy to acquire unexpected advantage” (Security). The serious student of military history can cite many examples of how each principle has proven itself in battle. They have stood the test of examination for over 75 years and must therefore be unchanging. They are accepted at senior level military schools without the slightest instruction in how a leader today is to apply them. Their practicality is a given, and if the modern warrior cannot understand how each is to be used in future conflict, then he must not understand the principle itself. Any contradiction between principles such as the contradiction between Mass and Economy, between Mass and Security or Security and Surprise is understood. The user who seeks balance between them seeks mastery of the “Art” of warfare. As indicated by FM 100-5, these principles are to apply equally to all three levels of war. But if there are distinctions between the strategic, operational and tactical levels of war and sometimes even tension between levels, then what level of war do they really pertain to? The answer is--the tactical level. These principles were first derived from warfare conducted during the Agrarian and early Industrial Age conflicts when there was little distinction among the levels of war. *They were first penned as Principles of Battle!* Criticism from military professionals both here and abroad followed almost immediately. A full account of that criticism is beyond the scope of this paper. For that, the reader is directed to reference³, which devotes an entire chapter to each principle (more than 150 pages). However, in order to adequately argue the thesis, three of the current principles are briefly discussed.

Maneuver. The FM 100-5 definition encapsulates the restrictive value of this principle. It speaks only of a means rather than the desired end state. While it incorporates the concept of advantage, it emphasizes only one type (positional) without regard to the others already discussed. Most important, it is misleading. When faced with an enemy strength, the commander can confront it, or he can bypass it (that is, change the condition of its strength) rendering it irrelevant. The latter is the implied purpose of maneuver but it is emphasized to the extreme. The commander must recognize the balance between the two, accepting that the enemy will adapt and that there is a point of diminishing effectiveness. More to the point, it is about finding or creating an advantage and then exploiting that advantage. Maneuver is but one of the ways of achieving that condition.

Offensive. The current definition is more about *initiative* than it is about offense for it is assumed that the force on the offensive must, by definition, have the initiative. Did Pickett have the initiative when he made his ill-fated charge at Gettysburg? Did the Iraqis change the tide of the Gulf War when they went on the attack at Khafji? In both cases--No! History shows us that offensive operations fail as frequently as they succeed, and that the attacker loses the initiative that he seeks. For the warrior at the tactical level, this principle has merit primarily for its moral value, but as a dictum for the operational or strategic level of war, it can just as frequently have catastrophic consequences.

Mass. "Mass the effects of overwhelming combat power at the decisive place and time."⁴ This principle certainly conveys the concept of advantage particularly as it relates to the newer interpretation of massing effects rather than the more traditional view of massing combat power. Nevertheless, in an era of greater precision and knowledge of the battlespace, its relevance has been diminished. Mass only has relevance in the context of uncertainty and

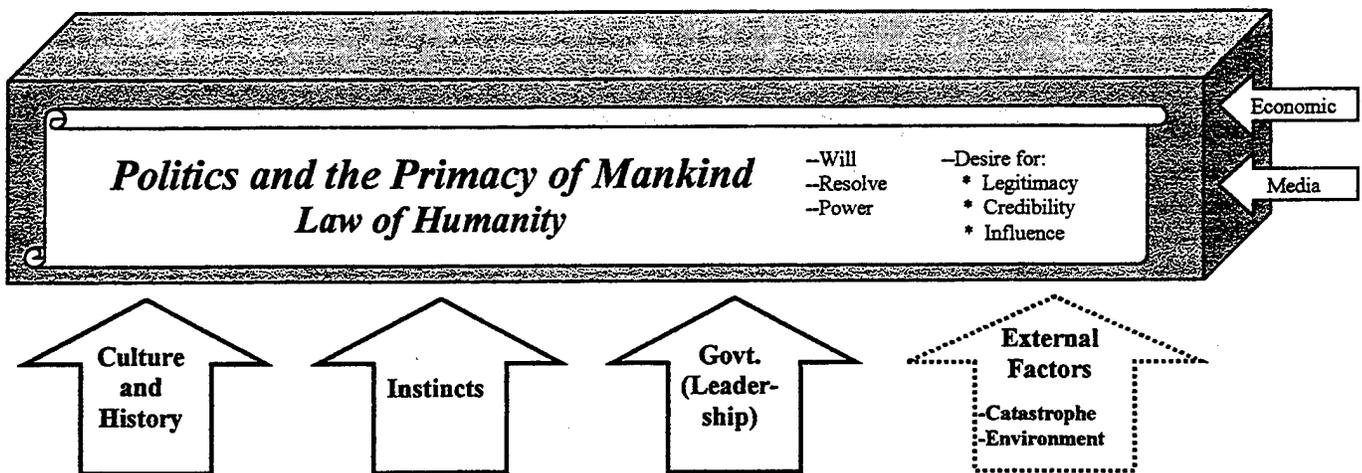
within the context of synergy of complementary weapons. If you can hit someone with your first bullet, why would you shoot him six or twelve or twenty more times? You likely wouldn't. If a commander understands that the combined application of mortars and machine gun fire can produce a greater kill ratio than the individual contributions of each system used separately, is he really "overwhelming" the opponent or optimizing the most effective use of his assets?

Finally, we must concede that these principles are used far more often to evaluate the past than they are to predict the future. Having conceded this point, are these principles best suited for the future?

The New Principles of War

The new principles that we establish must start from the truths that have already been established. These will be presented as laws. They are intended to reflect those aphorisms about man and conflict that are unchanging. There are four laws, one independent and three dependant on the first. The first law is in regards to the Politics and the Primacy of Mankind (Law of Humanity).

Figure 2. Politics and the Primacy of Mankind (Law of Humanity)



The Law of Humanity provides insight into the will and resolve of people and the undeniable quest for power that includes the desire for influence, legitimacy and credibility. The primary influences upon the law of humanity are the basic instincts of man (with survival being the most basic), and the different Cultures and History of the individual states as well as the differences between Government leadership. In some cases, there are also significant external factors such as environmental resource constraints or a catastrophe that precipitates a change in the balance of power or a desire for wealth redistribution. To a lesser extent, Media and Economics (world as well as state) also influence the Law of Humanity. The theory to be derived from the Law of Humanity goes back to the original goal--Compel the enemy to do our will. This defines a situation indicating that we are applying some coercive measure and our opponent is defying that coercion. This defiance takes two forms: rational and irrational. The rational form can be described by the following:

Postulate #2	Cost to Comply > Burden of coercion = Defiance
---------------------	--

It indicates that when the opponent perceives that the cost to comply with our demands is greater than the actual burden of coercion, then the leadership will defy our will.

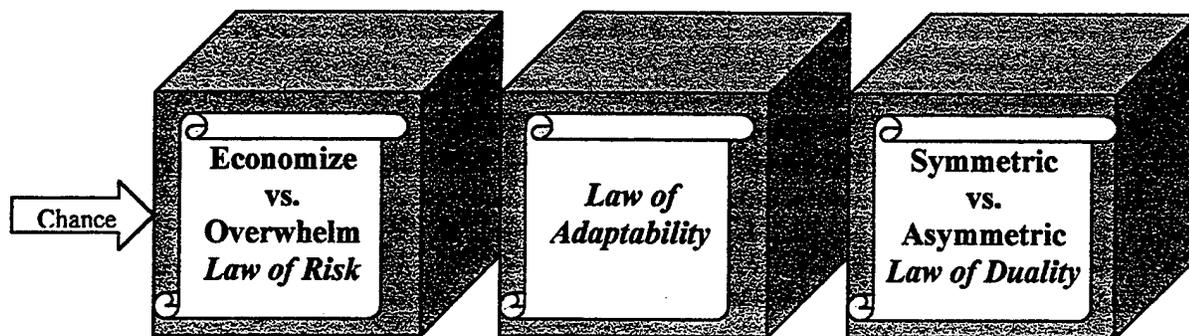
When applying this postulate, the operational commander must ask the following questions:

- 1) Who is bearing the burden of our coercion?
- 2) What is the link between the bearers and the policy decision makers, i.e. do these bearers have an ability to influence the decision makers?
- 3) Is the cost of compliance for the opponent so high that the application of military power will be largely ineffective in being able to increase the burden of defiance sufficiently to counter it?
- 4) What does the effects function of the coercion method look like? If it is diminishing or expected to begin diminishing shortly, then defiance will continue.

Within the irrational form, the commander must consider that defiance is sometimes for defiance sake (just ask a teenager). Although perceived by us as irrational, it almost always has its roots in the conquest of power. The commander must also consider what is the perception of our resolve? What appears to be an irrational response may instead be the application of rational calculus as he perceives our resolve to carry through with the actions initiated or indicated.

The next three dependant laws build from the first.

Figure 3. The Three Dependant Laws based on the Law of Humanity



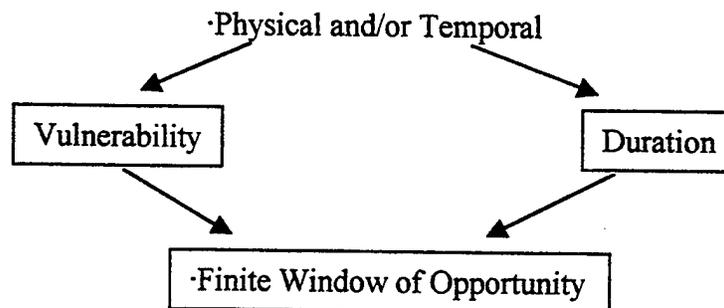
These three laws together account for all the possible outcomes of any engagement and therefore any war. The Law of Risk attempts to capture what we recognize as the concept of economy. Risk, while considered inherent to the application of any force, is not captured by any of the previous principles or the tenets of [Army] operations[†]. It should be for in it lies one of the most basic tenets of ADVANTAGE--risk management. The Law of Adaptability captures Truth #3 and instructs the commander that he must be alert to both the

[†] FM 100-5 describes the 5 basic tenets of Army operations as Initiative, Agility, Depth, Synchronization and Versatility.

reciprocal nature of his actions (the opponent will respond) and to diminishing effects. The last law, the Law of Duality, is an encapsulation of the previous argument regarding how to deal with an enemy strength--confront it directly or find its vulnerability! Leonhard refers to the latter method as Dislocation and is based on the same idea as an asymmetric response. This premise of the duality of war has been variously described in literature. Clausewitz referred to it when he talked of the aim of war (disarming the enemy) as different from the object of war (imposing our will on the enemy). Arguments such as counterforce vs. countervalue, annihilation vs. exhaustion and subjective vs. objective warfare all have as a basis the Duality of War.

Having now presented the Laws that serve as the foundation for the principles of war, the focus now shifts to the new principles. As presented before, the "How" of compelling our opponent is the constant quest for advantage. This premise is so important that ADVANTAGE becomes the first principle of war. In order to understand this first principle, it is necessary to dissect its characteristics as shown in the figure below:

Figure 4. Characteristics of an Advantage

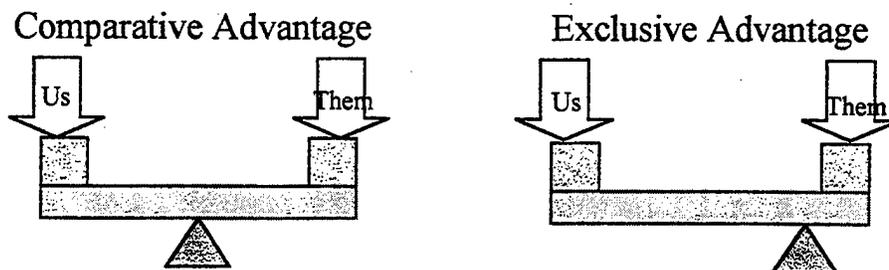


The following points regarding advantage are deduced:

- It will be physical (tangible) or temporal (intangible, i.e. moral, information) or both.
- Advantage has a vulnerability or duration limit or both.
- It is useless unless exploited.
- It has a limited window of opportunity to be exploited.
- Once exploited, has some return function (constant, increasing or decreasing).

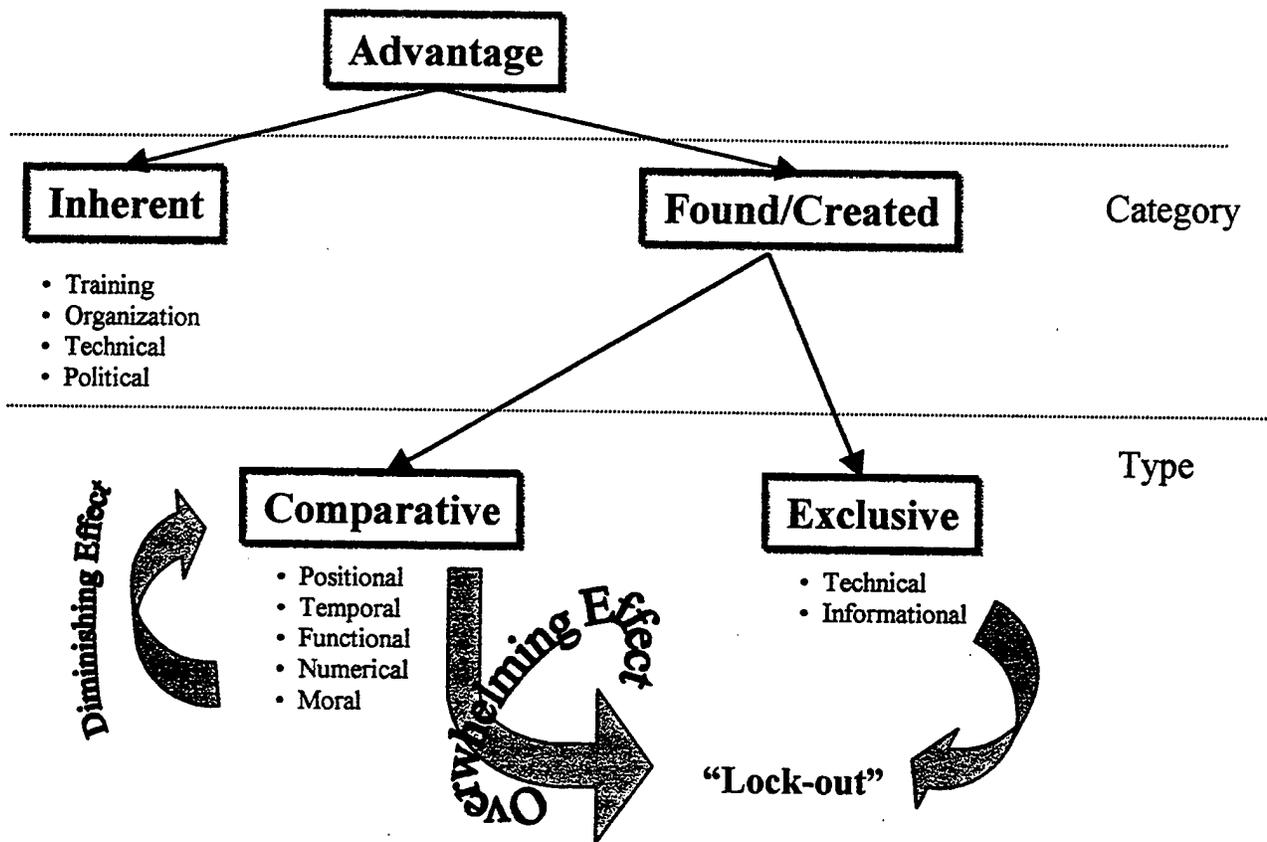
Advantage falls into two categories: Those Inherited (training, organization, etc.) and those Found/Created. Within the later category, there are two types: Comparative and Exclusive. The difference is that Exclusive advantage is created by the exploitation of a critical vulnerability of the opponent and has as its only counter (its own vulnerability) the correction of the vulnerability that was first exploited. Tactical example: The critical vulnerability of a nuclear power plant is the coolant circulation pump which, if taken out, renders the plant inoperable. Rendering the pump inoperable is an Exclusive Advantage which can only be corrected by restoring the circulation function (fix this pump or get another). Because Exclusive Advantage has but one recourse, it can lead to a condition termed here as "Lock-out".[†] Comparative Advantage can create the same condition, but only if the return function is increasing--a situation which overwhelms the opponent. The figures below are provided to summarize this discussion.

Figure 5. Comparative and Exclusive Advantage



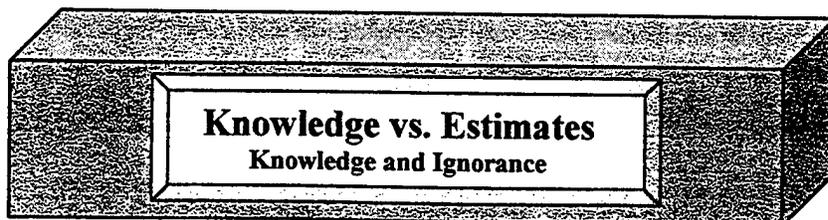
[†] Lock-out here is defined as a condition which immediately causes the opponent to pass his Culminating Point.

Figure 6. Summary of Advantage



I will now adopt the convention of Leonhard in presenting the remaining principles as a dialectic. In doing so, the principles themselves then represent the extremes of the individual concepts and therefore all the possibilities that a commander must consider.

Figure 7. The Principle of Knowledge and Estimates



Knowledge (referred to as information superiority) is the primary tenet behind the concept of full spectrum dominance that is espoused in Joint Vision 2010 and has become the cornerstone for Network-Centric Warfare. The critics, such as Col. T. X. Hammes, USMC argue that this kind of logic is flawed for the following reasons:

- It will not change the fundamental nature of war.
- It will not necessarily give us a marked advantage over a potential enemy.
- We cannot achieve or maintain information superiority in every case and therefore the concept is fatally flawed.
- A technology-driven higher speed of decision will not necessarily provide an inherent advantage.

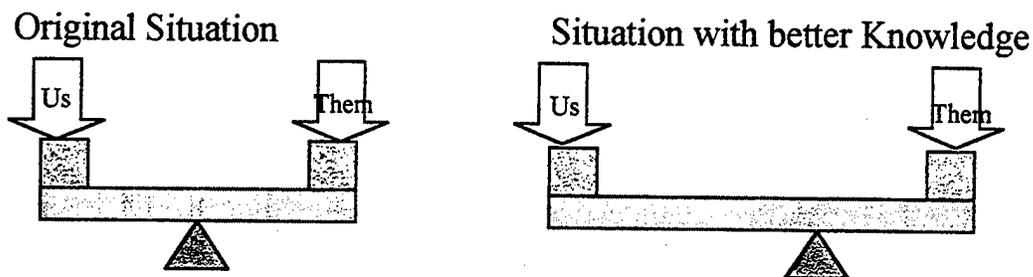
The article makes some valid points but comments only on the *feasibility* of perfect knowledge without recognizing the *desirability* of it. Given a choice of having knowledge of the enemy and the environment over estimates of the same, knowledge is better. Knowledge of the enemy facilitates the use of precision munitions with great economy of force while minimizing risk. Likewise, estimates require the more traditional approach of mass, concentration, and positional warfare. The principle of Knowledge and Estimates presented here does not presuppose that we will maintain information superiority or that estimates based warfare is bad. Three important points need to be made:

- 1) Knowledge has a price in both time and assets. Estimates are significantly cheaper and ignorance is free.
- 2) Knowledge does NOT guarantee our understanding of intent.
- 3) Information dominance cannot be achieved by the mere addition of more sensors, computers, and communications gear. It will not exist until it is an integrated package of all of these, combined with training and welded into our doctrine. It must, of necessity be at the center of our diamond as shown in figure 1.

From these points we deduce that perfect knowledge is UNOBTAINABLE. Further, relatively better knowledge than our opponent is expensive and must be subjected to the Law of Risk to determine its opportunity cost. However, there is a great pearl within this integrated system of systems. It is that the investment in knowledge yields economies (many significant) in every other aspect of warfighting. *Knowledge yields great advantage and can*

itself become a weapon! Using the analogy of the balance beam as shown in the discussion of the principle of Advantage, *Knowledge is the beam!*

Figure 8. The Impact of Relatively Better Knowledge



The salient point is not the feasibility of absolute or even partial knowledge because those will change with technology. It is that the balance we strike between knowledge and estimates will affect all other principles. The application of the principle of Knowledge vs. Estimates flows like this:

- 1) What do I know about the enemy and what does it tell me in relation to his strengths and weaknesses versus mine?
- 2) What don't I know about the enemy and what is the opportunity cost of gaining such knowledge?
- 3) From what I don't know about the enemy, I must make some estimates. What indicators are available that will validate or refute these estimates?

The remaining principles must show this requirement for balance. Each represents the endpoints--the thesis and antithesis of a given condition. The balance that the commander strikes will be based on his knowledge and level of risk. They are paraphrased directly from Leonhard's book.⁶ Because these six remaining principles build upon the earlier discussion, they seem anti-climatic. If the Laws are accepted as the foundation, and the principles of Advantage and Knowledge are viewed as the balance itself, then the remaining six principles are logical extensions of this thought process.

Dislocation vs. Confrontation. Confrontation is the direct engagement of the opponents' strength. It pits strength against strength and is considered symmetrical. Dislocation is the art of rendering the opponents strength irrelevant. Contrary to the name, dislocation can include circumvention or the total avoidance of the enemy strength but the

likelihood of such an opportunity, particularly at the operational level is remote. Other forms of Dislocation have already been discussed: Positional, Temporal, Functional and Moral.

Distribution vs. Concentration. Concentration is equivalent to the old principle of Mass--the application of combat power at a specific place and time. Distribution is the opposite and has both spatial and temporal components. Temporal distribution (preemption) sacrifices combat power to attack while the enemy is unprepared. Concentration sacrifices time to garner combat power. Spatial distribution is the apportionment of combat power such that there is just enough force in each area to accomplish a task. Knowledge permits more spatial and temporal distribution whereas uncertainty would indicate a need for concentration to guard against enemy action.

Activity vs. Security. Security is those measures taken to protect the friendly force from the opponent's action. Activity is all other friendly actions. The greater the knowledge, the more economically a commander can secure friendly forces and thus conduct more activity against enemy forces.

Opportunity vs. Reaction. Opportunity is freedom of action. Reaction is the response to enemy freedom of action. In reactive warfare, the commander accounts for enemy freedom of action, attempting to limit it and eventually destroy it, thereby reclaiming his freedom of action (opportunity). This was the classic definition of offense and initiative, but these terms only had meaning within the context of ignorance. Even in reactive warfare, better knowledge can result in destruction of enemy opportunity thus negating both offense and initiative.

Option Acceleration vs. Objective. Objective warfare involves the early determination of a desired end state and then capitalizes on that decision through focus. Option acceleration has flexibility as a basis, delaying the decision on desired end state in order to be able to rapidly create tactical, operational and strategic options through exploitation.

Command vs. Anarchy. Command is authoritative direction and seeks unity of effort through that direction. It is economical decision making but can impose inflexible or uneconomical restraint on subordinates. Anarchy (like a peer to peer relationship) seeks optimization of subordinate actions but suffers from uneconomical decision making. Greater knowledge allows command to work more effectively through more effective synchronization.

Figure 9 on page 18 shows the entire framework.

What's right with the CES Process?

As a tool for guiding the commander through mission analysis and net assessment, it has great merit. It attempts to apply rigor to a process previously considered only in the realm of "military art" or "military genius".

What's wrong with the CES Process?

Superficial and inflexible. Consider the military axiom that "No plan survives the first engagement." Consider also the statement made by many officers who have participated in the process that the numerical scoring from the analysis of courses of action rarely has any influence on or relevance to the commander's decision. Only "significant" differences need to be justified--an outcome which is unlikely to occur given the wide latitude applicable to the weight system. All the current system can hope to accomplish is to TRY to make sure that the commander has not made a gross mistake or oversight. But the system is outdated because it has not accounted for increasing battlespace knowledge⁷ and cannot accommodate Option Acceleration. No plan survives the first engagement because the process rarely considers events past the first move! "Too hard," the reply and hence our emphasis on overwhelming force, offense and initiative and our pessimistic view of anything that would challenge them. Within the last decade, technology has provided us the opportunity to apply

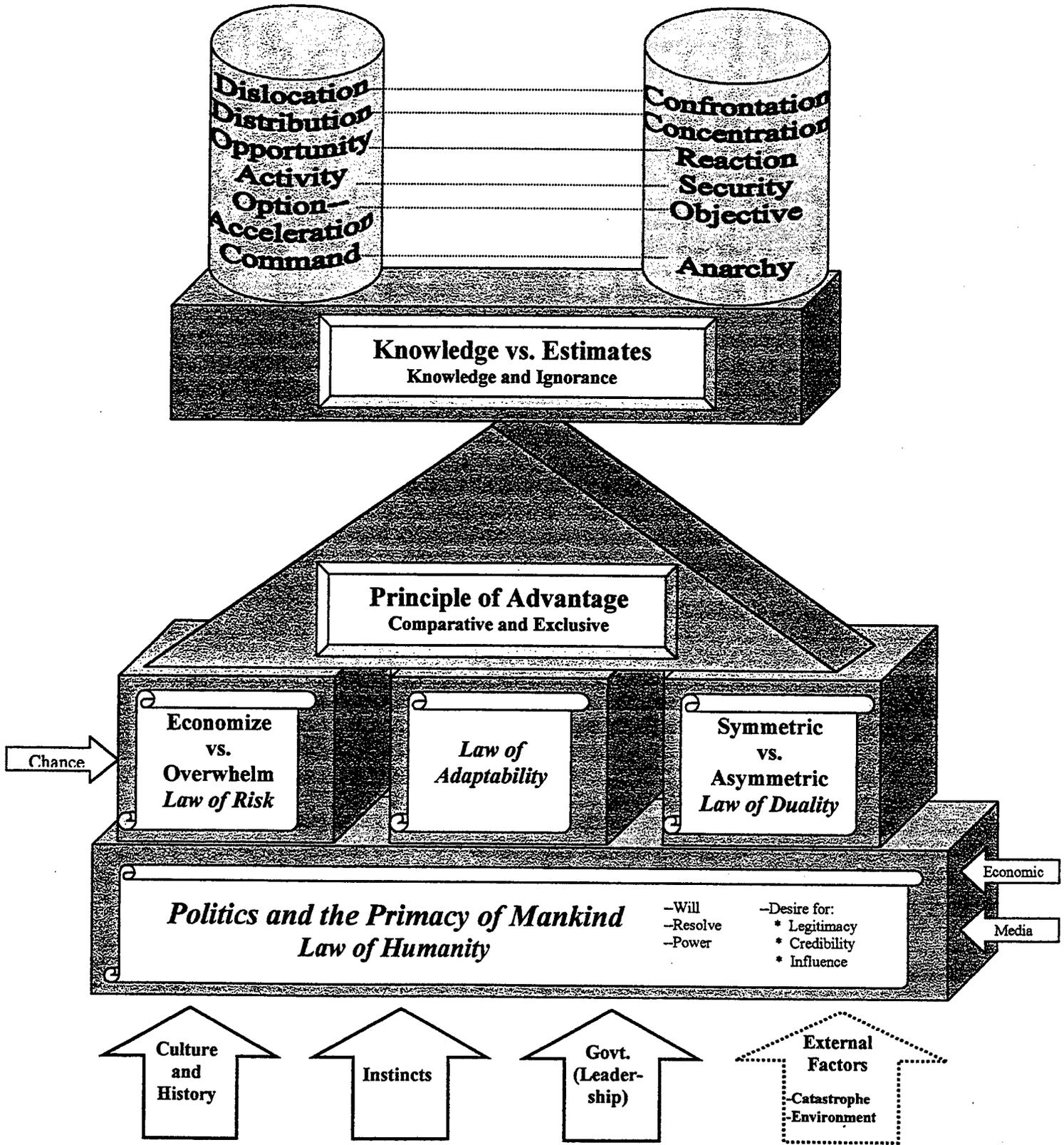
real science and rigor to the profession of arms. Modeling and decision aids have limitations but those diminish everyday. It is time to begin the process of integrating them into the CES process. Information cannot diminish the brutality, chaos or emotion of war except by shortening its duration, *but it WILL make the outcome more predictable.*

Conclusion

The principles of war, which are the foundation of doctrine, should reflect a synthesis of the dynamics of warfare and therefore provide a framework for creative solutions. They should be based on our fundamental understanding of man and the nature of war while being able to adapt to the uniqueness of any situation. Most of all, they should provide some contribution towards success on the battlefield. The classic principles did that on the battlefield through the late 19th and early 20th century but their rote application now can no more lead to success than carrying a lucky penny⁸. What's needed now are principles that reflect critical thinking and the dynamics of adaptation and diminished effects. These principles, modified from Leonhard's book, are a step towards that goal.

For the lecturer on Network-Centric Warfare, count among the enthusiasts one more member. I choose to join the ranks of these self-selected optimists who accentuate the positive and the potential. The enthusiasts will seek correction, improvement and ultimately success. The pessimist seeks only the empty consolation from the hope of being right. The one lesson that stands out is the need for rigorous debate and adaptation. No miracles. No absolutes. No revolution (in military affairs). We must cultivate skeptical faith, critical observation skills, and perseverance. We must try to better clarify and define the ends, so that we can better choose our means⁹. That is also the goal portrayed in this framework.

Figure 9. The Complete Framework for the New Principles of War



Notes

¹ Leonhard, Robert R. Fighting by Minutes: Time and the Art of War (Novato, Ca: Presidio Press 1996) 25-45.

² _____ . The Principles of War For The Information Age (Novato, Ca: Presidio Press 1998) 11.

³ Ibid.

⁴ Department of the Army, Operations. Field Manual 100-5 (Washington: Department of the Army Headquarters, June 1993) 2-4.

⁵ Hammes, T. X., Colonel, U. S. Marine Corps, "War Isn't a Rational Business", U.S. Naval Institute Proceedings, July 1998, 22-25.

⁶ Leonhard, Principles, 255-261.

⁷ Cooper, Jeffery "Dominant Battlespace Awareness and Future Warfare" at Institute for National Strategic Studies. <http://www.ndu.edu/ndu/inss/books/dbk/dbkch06.html> (April 1999), 1

⁸ Leonhard, Principles, 261-262.

⁹ Landes, David S. The Wealth and Poverty of Nations: Why Some Are So Rich and Some Are So Poor (W.W. Norton & Co. 1998) 523-524.

Bibliography

- Alberts, David S. Defensive Information Warfare. Fort McNair: National Defense University, Institute for National Strategic Studies, Center for Advanced Concepts and Technology, 1996.
- _____. The Unintended Consequences of Information Age Technologies: Avoiding the Pitfalls, Seizing the Initiative. Fort McNair: National Defense University, Institute for National Strategic Studies, Center for Advanced Concepts and Technology, 1996.
- Bjorklund, Raymond C. The Dollars and Sense of Command and Control. Washington, DC: National Defense University Press, 1995.
- Bondi, James J. Strategic Wargaming: JLASS [Joint Land, Aerospace, and Sea Simulation] into the 21st Century. Strategy Research Project. Carlisle Barracks: US Army War College, 7 April 1997.
- Vice Admiral Arthur K. Cebrowski, U.S. Navy and John J. Garstka, "Network-Centric Warfare--Its Origin and Future", U.S. Naval Institute Proceedings, January 1998.
- Cooper, Jeffery "Dominant Battlespace Awareness and Future Warfare" at Institute for National Strategic Studies. <http://www.ndu.edu/ndu/inss/books/dbk/dbkch06.html>. April 1999.
- Gray, Colin S. "The Changing Nature of Warfare?" Naval War College Review 49 (Spring 1996):7-22.
- Guthrie, Samuel A. Knowledge-Based Operations: The "So What" of Information Warfare. Fort Leavenworth: US Army Command and General Staff College, School of Advanced Military Studies, 19 May 1995.
- Hammes, T. X., Colonel, U. S. Marine Corps, "War Isn't a Rational Business", U.S. Naval Institute Proceedings, July 1998.
- Henry, Ryan and C. Edward Peartree "Military Theory and Information Warfare", Parameters Autumn 1998
- Landes, David S. The Wealth and Poverty of Nations: Why Some Are So Rich and Some Are So Poor (W.W. Norton & Co. 1998) 523-524.
- Leonhard, Robert R. Fighting by Minutes: Time and the Art of War. Novato, Ca: Presidio Press 1996.
- _____. The Principles of War For The Information Age. Novato, Ca: Presidio Press 1998.
- Libicki, Martin C and Stuart E. Johnson. Dominant Battlespace Knowledge. Washington: National Defense University, 1996.
- Mains, Steven J. "Adopting Doctrine to Knowledge-Based Warfare." Military Review 77 (March-April 1997): 93-95.
- Miller, Dr. John H. "Information Warfare: Issues and Perspectives" at Institute for National Strategic Studies, National Defense University. <http://www.ndu.edu/inss/siws/ch7.html>. March 1995.
- Porter, Michael E. "The Competitive Advantage of Nations". Fortune March 12, 1990, 94-108.
- US Air Force. New World Vistas: Air and Space Power for the 21st Century: Information Applications Volume. Washington: US Department of the Air Force, June 1996.
- US Department of the Army, Operations. Field Manual 100-5, Washington: US Department of the Army Headquarters, June 1993.

_____. Information Operations. Field Manual 100-6. Washington: US Department of the Army, 27 August 1996.

US Joint Chiefs of Staff. Information Warfare: A Strategy for Peace... The Decisive Edge in War. Washington: US Joint Chiefs of Staff, 1996.

US Joint Warfighting Center. Concept for Future Operations: Expanding Joint Vision 2010. Fort Monroe: US Joint Warfighting Center, May 1997.

Ward, Thomas E., II. Information Warfare: Is it Feasible? Desirable? Strategic Research Project. Carlisle Barracks: US Army War College, 29 March 1996.