

Command and Control Warfare: An Operational Imperative In The Information Age

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EXECUTIVE SUMMARY

Title: Command and Control Warfare: An Operational Imperative in the Information Age.

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Thesis: That waging successful information war is how wars will be won in the future and that the key to operational success by military forces in information war is in the strategy and target set known as Command and Control Warfare (C2W).

Discussion: The information age posits information war and a fundamental shift in how wars will be waged in the future. CJCS General John Shalikashvili's *Joint Vision 2010: Force of the Future* (JV 2010) is the mechanism used to explore information warfare at the operational level. Analyzed in depth is JV 2010's lynch pin concept of 'information superiority,' as gaining information superiority is the heart of successful information warfare.

In the course of analyzing how military forces gain information superiority, the idea that all military information invariably follows a path from 'sensor to decision-maker to shooter' is developed. This "military information path" idea illuminates the specific fundamental changes and corresponding impacts on warfare in the information age. From these 'changes and impacts' comes an assessment of the military tasks to be accomplished to wage successful operational information war. This serves as a springboard into the concept of C2W.

C2W is taken apart, analyzed and put back together as an integrated whole as a strategy and target set to wage successful information war. A relatively recent doctrine, its pillars are classified by their moral and physical aspects as a new way of understanding their relationship to one another. Doctrine and historical example are fused to support the thesis that C2W is the key to victory for operational level warfighters. A case study of the first war of the information age, Operation Desert Storm, is provided to test the thesis.

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Conclusions/Recommendations: From the research presented, four major points accrue which combine to support the thesis. These are:

1) A recognition of the information war battlespace of information systems and systems-of-systems.

2) That the impetus to change in the new battlespace is to avoid defeat on the scale of Iraq's, as Iraq was an industrial age force crushed in part by the U.S nascent information age capabilities.

3) That the prize of information warfare is information superiority. Information superiority is the ability to influence the enemy commander's decision loop while maintaining the sanctity of one's own.

4) Therefore, the key to victory in operational level information war is adoption of the strategy and target set that is C2W. C2W is the way military forces gain information superiority in the information age.

Following from the above, it is recommended that C2W:

1) Be viewed and employed as a discrete strategic whole vice in its traditional individual pillars.

2) Be considered a co-equal battlespace function to maneuver, shaping, force protection, and support, for operational planning purposes.

3) Be recognized as imperative to successful operational level of warfighting in the information age. C2W cannot be viewed as a purely strategic level of war concern.

**COMMAND AND CONTROL WARFARE:
AN OPERATIONAL IMPERATIVE IN
THE INFORMATION AGE**

PREFACE

The United States is at a "strategic inflection point"; a time in the life of an organization "...when its fundamentals are about to change."¹ The technological advances of the information age are the progenitor of this strategic inflection point. For the United States military, the information age causes a fundamental shift in the way warfare will be conducted in the next century. 'Information War'--the broad rubric for war in the information age--is upon us.

This paper addresses the conduct of information war at the operational level of war. Its thesis is that waging successful information war is how wars will be won in the future and that winning the 'Command and Control Warfare' (C2W) battle is how military forces wage successful information war. Conclusions and recommendations that follow from the thesis are expressed to advance the understanding of operational information war and to enhance the ability of the United States military to successfully conduct it.

Specifically not taken up is the strategic implications

¹ Andy Groves, *Only the Paranoid Survive*, New York: Bantam Doubleday, 1996.

of information war as the majority of writings to date seem to be concentrated at that level. The work therefore answers to a perceived shortfall in the on-going discussion concerning information warfare, namely a lack of a studied focus on the operational battlespace and the collision of military forces.

Chapter One delves into the nature and relevance of information war. The intent of the chapter is to develop the first half of the thesis, specifically that the way wars will be won in the future is through information warfare. Examined are the factors that combine to create the conditions that necessitate operational information warfare.

Chapter Two accomplishes several objectives. First it is designed to examine the second half of the thesis, namely that winning the C2W battle is how military forces wage successful information war. Second, because C2W is a new concept, the paper consciously serves as a primer, delving into each of its five pillars in depth. The intent is to bring under one source a detailed intellectual examination of each of the pillars, supported by historical example. In this examination, the pillars of C2W are grouped by the moral and the physical as a new way of understanding how the pillars relate to each other.

Third, Chapter Two considers that the way to win the C2W battle is to integrate the individual pillars in a synergistic

way. A historical example from WW II supports this statement.

Chapter Three examines through the prism of C2W the first war of the information age, Operation Desert Storm. How well C2W animated the Coalition's strategy and execution of operations is exposed and analyzed. C2W is viewed through both its moral and physical expression, and sought is an assessment of C2W's decisiveness in Desert Storm.

The paper concludes with Chapter Four, where the conclusions drawn from the research and analysis are presented. Specific recommendations and related questions bearing further examination are also raised.

The United States military must be able to win on any battlefield. The changes to warfare wrought by the dawning of the information age therefore can not be overlooked. At the strategic inflection point, America's military must pivot smartly and embrace the future, or become outdated and ultimately defeated on future fields of conflict.

Chairman of the Joint Chiefs of Staff General John Shalikashvili's *Joint Vision 2010: Force of the Future* (JV 2010) is the mechanism used to explore information warfare at the operational level. Analyzed in depth is JV 2010's lynch pin concept of 'information superiority' as gaining information superiority is the heart of successful information warfare.

In the course of analyzing how military forces gain information superiority, the idea that all military information invariably follows a path from 'sensor to decision-maker to shooter' is expressed. The military information path idea is used to illuminate the specific fundamental changes and corresponding impacts on warfare in the information age. From the 'changes and impacts' come an assessment of the military tasks to be accomplished to wage successful operational information war. This serves as a springboard into Chapter Two and the concept of Command and Control Warfare.

and is a bridge into Chapter Three, where this idea is examined through the vehicle of an extended case study

CHAPTER ONE	1
A Joint Vision of Information Superiority	1
The Search for Information Superiority	3
The Information Age	4
Warfare in the Information Age	5
The Significance of Information Warfare	8
Achieving Information Superiority: C2W	14
CHAPTER TWO	16
Command and Control Warfare	16
Military Deception	19
Operations Security	23
Psychological Operations	26
Electronic Warfare	30
C2W Physical Destruction	33
The Greater Whole of C2W	34
CHAPTER THREE	38
Operation Desert Storm and C2W	38
Operation Desert Storm: The Plan	40
Commander's Intent and C2W	41
Information Superiority in ODS	42
C2W in ODS	45
Douhet's Dream Refined: Airpower in ODS	46
Tricking the Devil: Military Deception in ODS	50
C2W in ODS: Decisive	54
CHAPTER FOUR	56
What to Make of All of This	56
The New Battlespace	56
The Impetus to Change	57
The Prize	58
The Key to Victory	59
Miles to Go Before I Sleep	62
BIBLIOGRAPHY	65
Books	65
Monographs	67
Periodicals	67
Government Publications	70
Unpublished Materials	71
Unpublished Interview	71

CHAPTER ONE

A Joint Vision of Information Superiority

Chairman of the Joint Chiefs of Staff (CJCS) General John M. Shalikashvili published in July 1996 his personal vision of how U.S. forces will fight in the next century.¹ Entitled *Joint Vision 2010: Force of the Future*, his vision is a conceptual template articulating the ways U.S. forces will realize new levels of effectiveness in joint warfighting in the next century. The document envisions joint forces achieving dominance across the spectrum of military operations through the synergistic integration of new operational concepts. The goal is for a small(er than now), high-quality force to win in the next century by leveraging new concepts to achieve the effects of mass without massed forces and sequential operations. Dominant maneuver, precision engagement, full-dimension protection, and focused logistics are the key concepts of the vision. Linking these concepts is the enabling concept of information superiority.²

Joint Vision 2010 (JV 2010) fundamentally has an operational perspective. Technological advances guiding weaponry over longer ranges to precise targets and improved command, control, and intelligence capabilities are harnessed synergistically. U.S. forces benefit from increased awareness of both the enemy

¹ Robert Holzer, "Battlefield Vision Stresses Information Speed," *Army Times*, Vol. 56, issue 30, Feb 19, 1996: 26.

² John M. Shalikashvili, "Joint Vision 2010: Force of the Future," *Defense* 96, issue no. 4: 6-21.

and friendly situation in the battlespace as a result of improved, all-source intelligence fusion efforts. Dominant maneuver follows as the simultaneous application of decisive force against enemy centers of gravity (COG) at all levels. COG identification is enabled by increased battlespace awareness. The sum goal is the multi-dimensional application of information, engagement, and mobility capabilities to achieve full spectrum dominance.

The ability of dispersed U.S. forces to control the breadth, depth, and height of future battlespaces inherently pivots on an improved, 'real time' awareness of what is going on in the battlespace superior to that of any adversary. This is the soul and the purpose of the concept of information superiority.

JV 2010, therefore, pivots on information superiority. Recognizing that throughout history "...gathering, exploiting, and protecting information have been critical,"³ JV 2010 anticipates the effects of increased access to information and the enhanced speed, precision, and accuracy of its transmission. Defined in JV 2010 as "the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting

³ Shalikashvili, 12.

or denying an adversary's ability to do the same,"⁴ information superiority is the keystone upon which the success of JV 2010 rests. Information superiority is the high ground that provides the asymmetrical advantage sought by commanders through history. Having it is essential to achieving the full scope of JV 2010.

The Search for Information Superiority

The search for information superiority is not new. Sun Tzu's observation to "Know the enemy and know yourself; in a hundred battles you will never be in peril"⁵ is well-known and timelessly accurate. Scouting the enemy in order to gain advantage from knowing his dispositions (and simultaneously protecting against his scouts) is likewise ancient. Intuitively, this task is also the essence of practicality. In this age-old quest for knowledge of the enemy, history abounds with examples of commanders who either gained or lost the race for information superiority to decisive effect. Prominent American examples include the Gettysburg campaign of 1863, where General Robert E. Lee lost his picture of the Union Army and blundered into a meeting engagement without a battle plan and on inferior ground. Operation Desert Storm presents a recent example of the decisive effect of achieving information superiority. We will examine

⁴ Shalikashvili, 13.

⁵ Sun Tzu, *The Art of War*, trans. by Samuel B. Griffith, (London: Oxford University Press, 1963): 84.

this conflict in greater detail later in this paper. However, before reaching that juncture, we must first discuss what is new about the quest for information superiority that makes it different and relevant for today's warfighter. That difference is in the character of the dawning 'information age.'

The Information Age

A new age is upon us. In this new age, information flows like water. In some form it is everywhere, and like water, it is essential. Information as a concept is old, but how we manipulate, transfer, collate, store, and use it is changing with the force of a tidal wave. Information as water has become a raging torrent. This change is revolutionary in impact and scope. Increasingly, theorists note that modern times are transitioning to what is being hailed as 'The Information Age.'

Home computers, home satellite dishes, the Internet, cellular phones, etc., are all examples of how accessible information is to the common citizen. Due to the world-wide media, we can watch live events unfold in real-time, or watch satellite images of weather patterns across the globe. LtCol T.X. Hammes USMC observes that, "Hierarchical structures are breaking down as information systems are connecting people in new ways. The world is organizing into webs tied together by the

Internet and meshes tied together by powerful personal computers."⁶

The 'information superhighway' of popular rhetoric is real. On-ramps, off-ramps, as well as spur, connector and ring roads are appearing overnight and continually moving off in unexpected directions. Additionally, the information superhighway is an *autobahn* with no posted speeds. Dominating this highway are advanced-technology, high-performance machines that inherently realize that the race is to the swift.

Ultimately, the dawning of the information age represents acceptance of information (and all that it entails in this sense) as a tangible medium of human exchange, akin to earth, water, and sky. Like those familiar settings, it can not help but be an arena for human conflict. This conflict is emerging under the rubric of information warfare. Information superiority must and will be the result of successful information warfare.

Warfare in the Information Age

The intellectual roots of information war thinking lies in the work done by noted futurists Alvin and Heidi Toffler. Their thesis is that the way we make wealth is the way we make war and that in the future, the manipulation of information is the way we will make wealth.⁷ Building on their earlier work, *The Third Wave* (1980), they offer a corresponding emerging third wave of

⁶ Thomas X. Hammes, "Don't Look Back, They're Not Behind You," *Marine Corps Gazette*, Vol. 80, No. 5 (May 1996): 75.

⁷ Alvin and Heidi Toffler, *War and Antiwar: Survival at the Dawn of the 21st Century*, (New York: Little, Brown and Co., 1993): 3-5.

warfare. In the Tofflerian view, third wave warfare will supplant our current (or second wave) industrial way of warfare by harnessing information technology much as third wave economies will eventually supplant second wave economies.⁸ We will make war by manipulating information.

The change from second wave to third begins with the technological ability to gain and exchange rapidly--and therefore more efficiently use--information on a wide scale. Increasingly, dispersal (the opposite of mass), systems integration, networks, fiber optics, miniaturization, and other innovations now being seen in commercial applications are being translated into military applications with unprecedented effects on how we organize and wage war. For example, networked computers massage a common data base (specifically, the Time Phased Force Deployment Data or TPFDD) to plan and monitor the world wide deployment and redeployment of U.S. forces. On the ground and at sea, we are gaining continuous and precise understanding of where our troops are through the Global Positioning System (GPS). Enhanced information gathering capabilities (satellite imagery, laser range-finders, etc.) are improving our certainty on where the enemy is. Couple all of this with precision weaponry and you get an "If I can sense you, I can kill you" paradigm. The fog of war *is lifting*--if perhaps only for a short while--through technological means.⁹

⁸ Toffler, 65.

⁹ Shalikashvili, 11-13.

Tofflerian thought on information warfare found ready acceptance in the U.S. Department of Defense, most notably in the Air Force and Army. Former Army Chief of Staff General Gordon Sullivan cited them repeatedly in a 1994 article on war in the information age.¹⁰ R.L. DiNardo and Daniel Hughes detail the influence of the Tofflers in a cautionary article on information warfare.¹¹ A review of the literature suggests the highest level of acceptance resides in the Air Force.¹² Much of Air Force acceptance seems the result of Operation Desert Storm, a perspective addressed later in this work.

Information war at the strategic level is the employment of all the tools of national power to gain information superiority over the enemy. Today, the cybernetic loop connecting sensor to shooter is dominated by technology. Intrinsically information warfare at all levels is associated with information systems

¹⁰ Gordon R. Sullivan and James M. Dubik, "War in the Information Age," *Military Review*, Vol. 74, no. 4 (April 1994): 46-62.

¹¹ R.L. DiNardo and Daniel J. Hughes, "Some Cautionary Thoughts on Information Warfare," *Airpower Journal*, Vol. 4, no. 9 (Winter 1995): 70.

¹² For example see , Owen E. Jensen, "Information Warfare: Principles of Third-Wave War," *Airpower Journal*, Vol. 8, no. 4 (Winter 1994): 35-43, or Richard Szafranski, "A Theory of Information Warfare: Preparing for 2020," *Airpower Journal*, Vol. 9, no. 1 (Spring 1995): 57.

(Admiral William Owens' "system-of-systems"¹³) and the struggle between opponents for control of the information realm.¹⁴ Our focus here is on the operational level of war. On this level, information war's basic premise hinges upon: (1) the rapid collection and processing of information to gain accurate understanding of a given situation; (2) the following rapid transmission of 'intelligent' (processed information equals intelligence) direction to forces that can speedily act with precision and effect.¹⁵

JV 2010's measure of success as an operational vision hinges on the ability to use the information advantage (asymmetric battlespace awareness gained through superior speed of transmission from sensor to shooter) in a decisive way--that is, dominant maneuver.

The Significance of Information Warfare

Fundamentally, information warfare is not a change in the nature of warfare; war is still Clausewitz's "... act of force to compel our enemy to do our will."¹⁶ Information war is instead a way to conduct warfare that intrinsically recognizes the changing

¹³ William A. Owens, "System-Of-Systems," *Armed Forces Journal International*, Jan. 1996: 47.

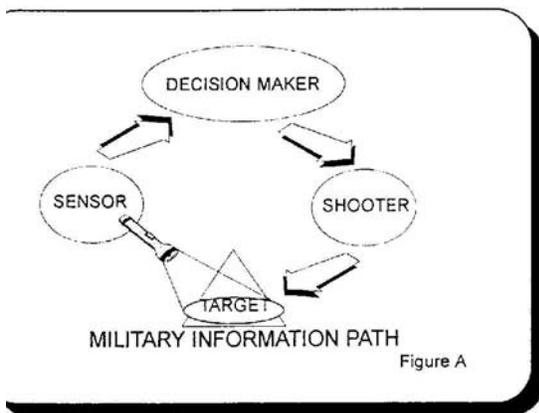
¹⁴ Jeffrey McKittrick, et al. "The Revolution in Military Affairs," Science Applications International Corporation, Proprietary Draft Paper, September 1994: 11.

¹⁵ Owens, "System-Of-Systems," 47.

¹⁶ Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976 [1832]), 75.

nature of the modern world. For the military, the most immediate and tangible aspect is the significantly increased speed in which military information travels the path from a force's sensory organs, to its brain, and on to the muscle. To demonstrate this, we must first look deeper into the path that military information inevitably follows. This is relevant to our inquiry, as in truth, information does not flow merely from 'sensor to shooter', but instead makes an intermediate--and critical --stop along the way.

Stripped to its bare essentials, all combat significant information moves along a path from sensor to *decision-maker* to shooter (Figure A). Information is valueless until it is processed into intelligence. This is to say information must be



analyzed and placed into context in order to have full value. This of course is the intelligence cycle. Further, *the value of intelligence is that it drives operations.* Together, intelligence and operations

comprise the thinking and creative parts of the loop, the end product of which are decisions and direction (orders).

In this model, something is seen (sensor) and is reported to a 'decision-maker.' The decision-maker decides what it is and

what ought to be done about it. There may be hierarchies of decision-makers (the chain of command), but ultimately, if action is to be taken, it is directed by the decision-maker to the shooter. 'Shooter' reflects the concept that intrinsically military forces are designed to kill people and break things. Shooter represents some unit, weapon, system (or a combination of the three) that takes action in response to the decision-maker's interpretation and use of the sensed information.¹⁷ All of these steps--'sensor to decision-maker to shooter'--are taken relative to the enemy. The model cycles back on itself through the sensing of new information about the result of its previous action (battle damage assessment) or some new enemy action.

The military information path is Colonel John Boyd's "OODA"¹⁸ loop through Alice's looking glass. Like information itself, the path is old. Scouts report enemy movement to their command post and, as a result, a force is dispatched to counter or take advantage of an (unexpected) opportunity. While information age capabilities do not change the stations along the path, the changes do have several impacts on the process that are relevant.

¹⁷ Or based upon a previously decided protocol, such as a Rule of Engagement.

¹⁸ Observe, Orient, Decide, Act. Also known as 'the decision cycle.'

The information age causes four fundamental changes in the conduct of war at the operational level, each with a corresponding impact. The four changes are: (1) a dramatic increase in sensor capability and output; (2) a volume of data that stresses the functional (or Napoleonic) staff model; (3) a dependency on systems to wage war; and (4) an increased speed of data transmission. The related impacts are: (1) an overwhelmed decision process due to information overload; (2) an information-organization mismatch; (3) identification of information systems as a critical vulnerability; and (4) the potential for real-time awareness of the situation, leading to information superiority and dominant maneuver. As each of the changes and impacts are linked, we will discuss each duality in turn.

The first change is that new technologies greatly increase the capabilities and outputs of the sensory organs. Satellites, as well as systems such as Joint Surveillance Target Attack Radar System (JSTARS) and Airborne Warning and Control System (AWACS), and a host of sophisticated radars, infrared devices, sonars, etc., are the new high ground. As a result, more facts are added into the decision formula. Logically it follows that since we see so much more, the brain has much more to think about. The related impact is a potentially overwhelmed decision process.

For example, during Operation Desert Storm, the Marine Corps local area network processed 1.3 million electronic mail messages in the first 36 hours of the ground war.¹⁹ At a bare minimum, just the human sorting of the messages--some of which were undoubtedly important--consumed time and delayed decision.

Second, the new technologies--created by industrial age societies--tend to serve masters in hierarchical organizations. As a result, the data collected by sensory organs have but one destination--the top--and one road to it. Information in Napoleonic command and staff structures is owned, not shared. Staffs collect, collate and analyze information principally for their commander. The second change therefore, is that the volume of data stresses functional staffs and causes friction in the decision process. Important data can be obscured in a haystack of white noise and inconclusive or false reporting. Marine Commanders in Beirut "...received a great volume of intelligence warnings about potential terrorist threats..."²⁰ prior to the terrorist attack of 23 October 1983, yet were unable to pick the real threat out of the pile. The impact is a mismatch between information and organization where the current staff structures can not bear the weight of the data pouring in. Until command structures implement the lattice potential of networked

¹⁹ Merrill L. Pierce, Jr., "Established Architecture Keys Marine Data," in *The First Information War: The Story of Communications, Computers and Intelligence Systems in the Persian Gulf War*, contributing ed. Alan D. Campen, (Fairfax, VA: AFCEA International Press, 1982), 153.

²⁰ Benis M, Frank, *U.S. Marines in Lebanon 1982-1984*, (Washington DC: Headquarters, U.S. Marine Corps, 1987), 108.

information age technologies, and make information a shared asset, much of the potential of increased information gathering is wasted.

Third, the ever growing use of inter-connected information systems causes a concurrent dependency on them. Dependency breeds vulnerability, perhaps a critical vulnerability.

Brigadier General Robert F. Dees of the Joint Staff maintains that, "Information systems may very well be an Achilles heel."²¹ As an example, consider the U.S. TPFDD system. Earlier, this system was cited as the system by which the U.S. plans and monitors the world-wide deployment of forces. Imagine then, the impact on U.S. capability to project power rapidly if that system were to be shut down, degraded or disrupted. *Time Magazine* reported that Belgian hackers offered (for a million dollar fee) to disrupt U.S. deployment to Operation Desert Shield; post-war investigation supported their claimed capability.²²

The point follows then, that as hierarchical management nodes are commonly found at road junctions along the information path, they become key terrain to be attacked and defended. This notion has its own logic: capture the intersection, block the road, degrade the force.

²¹ Interview, Brigadier General Robert F. Dees, USA, Vice Director for Operational Plans and Interoperability, J-7, Joint Staff, The Pentagon, 31 Jan 1997.

²² Douglas Waller, "Onward Cyber Soldiers," *Time*, 21 August 1995, 44.

Threats of this nature can only be expected to increase as new technology appears. They must be guarded against, lest information superiority be surrendered.

Fourth, and perhaps most importantly, when unimpeded, information is capable of moving to the decision-maker at unprecedented speeds. The impact of this change is that near real-time battlefield awareness is available. Real-time awareness is just around the corner. Real time awareness--electronically leading from the front--can engender better decisions.²³ Optimally, this enhanced battlespace awareness is shared, creating common battlespace awareness. The potential synergy from common battlespace awareness will increase execution proficiency by an order of magnitude. This is the motive for embracing the potential of organizational structures that allow information to flow rapidly to all that need it. The failure to do so will be at the cost of information superiority. Without information superiority, the dominant maneuver envisioned by JV 2010 is not attainable.

Achieving Information Superiority: C2W

Superior situational awareness is the end product of information superiority, and, throughout history, a force multiplier of decisive effect. Information superiority accrues

²³ See Fleet Marine Force Reference Publication (FMFRP) 15-3, *A Concept of Command and Control*, (Washington, DC: U.S. Marine Corps, 1994), 1-14 for a fictional, but thought-provoking, account of C2 in the near future.

to those who can get the information quickest from sensor to decision-maker to shooter. Adversaries will use the new technologies to enhance their efforts and to attack each other's systems. Therefore, information systems and information itself are increasingly centers of gravity in the classic Clausewitzian sense. Attacking and defending those centers of gravity are intrinsic functions of information warfare. In this light, two specific military tasks accrue as a result of the information age.

First, the information path of the enemy must be attacked and degraded. Second, but equally important, one must protect one's own military information path, specifically the technologically sophisticated version characteristic of the information age. These tasks are not simply centered on the destruction or protection of systems hardware or software. Information systems are dependent on the quality of the inputted information ('garbage in is garbage out'). Attempts to attack information will also be based upon feeding systems--and decision-makers--bad data.

The tasks are not new. However, as shown, they are of central importance given the nature of the information age. At the operational level of war, the military aspects of these tasks are captured in the concept of Command and Control Warfare (C2W). We will look into C2W in the next chapter.

CHAPTER TWO

For it is by upsetting the enemy's "balance" that the victory is won; the concentration of fire and the opening of the breach are only the means to the true end -- the psychological destruction of the enemy's will to continue resistance.

David G. Chandler, *The Campaigns of Napoleon*²⁴

Command and Control Warfare

In the previous chapter, we discussed the impact of the information age on the age-old quest for knowledge of the enemy. Information age technologies change the dynamic of this ancient quest by increasing the coverage of data gathering sensors and the speed by which information travels from sensor to decision-maker to shooter. Reliance on the technological systems that animate the information age mark the information sphere as a battleground. Consequently, two tasks accrue in the information war: protect one's own information systems and attack the enemy's.

The military aspect of this struggle is called command and control warfare (C2W). C2W is a strategy and a target set; combined are both ancient concepts and modern capabilities. Like much of war, C2W is heavily dependent on intelligence and communications. In this regard, it is a subset of information war; information war in full battle array is the use of all the tools of national power to create a competitive advantage at the national strategic level.²⁵

²⁴ David G. Chandler, *The Campaigns of Napoleon*, (New York: MacMillan, 1976), 135.

²⁵ Norman B. Hutcherson, *Command and Control Warfare: Putting Another Tool in the Warfighter's Data Base* (Maxwell Air Force Base, AL: Air University Press, September 1994), xvii.

Air Force LtCol Norman Hutcherson describes C2W as an implementing strategy that attacks, "...the command and control (C2) decision-making capabilities of an adversary while protecting friendly C2."²⁶ C2W is a military tool to be employed against opposing commanders and forces. It is applicable at all levels of war and in all spectrums of conflict.

C2W in its offensive mode is called C2-attack.²⁷ C2-attack assails decision-making by attacking information and the path that information travels from sensor to shooter. It blinds the eyes and clogs the ears. It confuses the brain through false information. It dulls or cuts the nerve connections between sensory organs and brain, as well as between brain and muscle. It fosters bad decision making and contributes to inaction, indecision, and mental paralysis by disrupting the opposing commander's OODA loop.

C2W's defensive mode is C2-protect.²⁸ C2-protect shields decision processes and command and control capabilities. It works to maintain friendly balance while shoving the enemy off balance. C2-protect activities include electronic signature

²⁶ Hutcherson, *C2W*, xiii.

²⁷ Joint Publication 3-13.1, *Joint Doctrine for Command and Control Warfare (C2W)*, (Washington, DC: Joint Chiefs of Staff, Feb. 1996), I-4.

²⁸ Joint Pub 3-13.1, *C2W*, I-4.

reduction, proper command post sighting, and the coordination needed to ensure that friendly C2-attack efforts do not adversely effect friendly operations.

C2W has five pillars: military deception, operations security (OPSEC), psychological operations (PYSOPS), electronic warfare (EW), and C2W physical destruction.²⁹ All serve the functional C2-attack and C2-protect roles of C2W. Combined they render C2W as an integrated, synergistic strategy designed to "decapitate the enemy's command structure from it's body of combat forces."³⁰

C2W's pillars can be viewed in two groupings. The first is through the relationship of C2W to truth. The C2W pillars of OPSEC, military deception, and PSYOPS deal with different aspects of the truth of friendly dispositions, capabilities and intentions. Accordingly, OPSEC hides truth, military deception tells 'untruths', and PSYOPS (truth-based) presents half-truths. Individually or combined they attack understanding, and consequently, decision. The focus is a soft-kill on the moral heart of decision-making.

The second grouping includes EW and C2W physical destruction. Physical systems receive attack from both electromagnetic energy and kinetic energy weapons. The intent is to control the systems (including, in a broad

²⁹ Joint Pub 3-13.1, *C2W*, II-4.

³⁰ CJCS MOP 30, *Command and Control Warfare*, 1st Rev., 8 March 1993, Encl. 3, as cited by Hutcherson, *C2W*, 21.

sense, the electromagnetic spectrum) that collect and transmit information. The focus is a hard-kill on the ways and means of decision-making and information handling.

Clausewitz spoke of the "remarkable trinity" of war and the impossibility of fixing an arbitrary relationship between the government, the army and the people.³¹ All three remain perpetually in a balanced tension. The pillars of C2W are the same. Viewing the pillars either individually, functionally as C2-attack or C2-protect, or through moral or physical lenses, does not obscure that all are inexhaustibly combinable in pursuit of the larger goal-- achieving information dominance over the enemy.

Each of the pillars of C2W bear deeper exploration. We will address each in turn, grouped by the moral and physical. We will begin with military deception.

Military Deception

Though fraud [deception] in other activities be detestable, in the management of war it is laudable and glorious, and he who overcomes the enemy by fraud is as much to be praised as he who does so by force.

Niccolo Machiavelli, *Discourses*, 1517³²

Military deception is as old as war. Sun Tzu's twenty-five century old observation that "all warfare is based upon deception"³³ articulates the timeless presence of deception in war. Marine Major John LeHockey concurs when he begins a

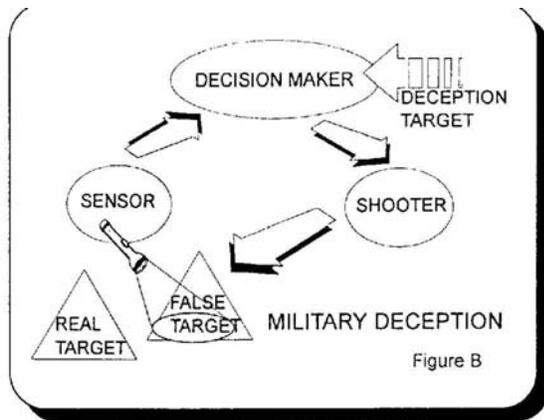
³¹ Clausewitz, *On War*, 89.

³² Niccolo Machiavelli, as cited in Joint Publication 3-58, *Joint Doctrine for Military Deception*, (Washington, DC: Joint Chiefs of Staff, May 1996), II-1.

³³ Sun Tzu, *The Art of War*, 66.

contemporary paper on strategic and operational military deception with a review of the art of military deception in the ancient and classical worlds.³⁴ Although it has been argued that deception has not been a pre-eminent U.S. stratagem due to Clausewitz's disdain for using deceit to generate military surprise,³⁵ it is now fully recognized as a vital part of C2W.

Military deception requires little definition. It is trickery and deceit to create a picture that does not accord with



the facts. Deception creates false information so as to skew the enemy's decision path. (Figure B) It leads the enemy to an *incorrect estimate of the situation.*³⁶ His false situational awareness is the poisonous tree,

the disaster of his related operations its bitter fruit. The

³⁴ John D. LeHockey, *Strategic and Operational Military Deception: US Marines and the Next Twenty Years*, (Columbus, OH: Mershon Center, Ohio State, 1989), published as *Fleet Marine Force Reference Publication 15-6*, (Quantico, VA: Marine Corps Combat Development Command, 1989), 16.

³⁵ See Michael I. Handel, *Masters of War: Sun Tzu, Clausewitz and Jomini*, (London: Frank Cass, 1992), specifically Chapter 11 (p. 101) for this argument. Also, National Defense University, *Joint Command and Control Warfare Staff and Operations Course: Student Text*, (Norfolk, VA: Armed Forces Staff College, January 1996), 9-2 - 9-3.

³⁶ Joint Pub 3-58, *Military Deception*, II-1.

object of military deception under C2-attack is the enemy commander and his decision process.

A classic example of military deception is a World War II British effort code-named "Operation Mincemeat." Mounted in early 1943, Mincemeat supported Operation Husky--the planned July 1943 Allied invasion of Sicily. Sicily was an obvious next operational objective for the Allies on the heels of the successful North African campaign. Mincemeat was born to deceive the Germans that the invasion would be elsewhere.³⁷

Mincemeat revolved around the placement of a briefcase containing documents detailing "Operation Brimstone"--an entirely fictitious invasion of Sardinia--into Spanish hands. Once there the Allies were certain it would be shared with the Germans. The same documents would let slip that Husky was to be the deceptive cover for Brimstone--to include pre-invasion bombardment of Sicilian airfields. Mincemeat's lie--that Husky was deception and Brimstone was real--was a big one.³⁸

The key documents were delivered to the Spanish at the correct time and place by a Major William Martin, Royal Marines. Major Martin was a corpse--an officer courier seemingly washed

³⁷ Ewen Montagu, *The Man Who Never Was*, (New York: Scholastic Book Services, 1971 [1st ed. 1953]), 8-9.

³⁸ Montagu, *The Man Who Never Was*, 38-41.

ashore in Spain after a plane crash at sea. He was a "mule" and the insert was staged--but the briefcase containing the essential documents was chained to his wrist. The "art" of Mincemeat was in the British presentation of the deception story, supported by the invention of the myriad details concerning Major Martin to convince the Germans that the courier, and therefore the information he carried, was valid. The "man who never was" was a persuasive liar and the Germans believed him.

Mincemeat was stunningly successful. Post-WW II examination of German records indicated that prior to Mincemeat, the Germans had correctly deduced that Sicily was to be the location of the next Allied invasion. Their perception showed an immediate shift away from Sicily *after* the arrival of Major Martin. Once Sicily was eliminated as an option, other options received support and serious discussion. Hitler, for one, believed the true effort would be in Greece and sent Irwin Rommel to command the effort there. German defensive efforts and force dispositions were disrupted by the Mincemeat documents, and the shifts aided the successful prosecution of Husky.³⁹

As shown, military deception seeks to give the enemy a false understanding of friendly situation and intentions and by such, adversely effect his decisions and actions. Relatedly, efforts

³⁹ Montagu, *The Man Who Never Was*, 129-141. For example, naval units moved away from Sicily and Panzer Divisions went to Corsica and Greece.

are also taken to ensure that an adversary does not gain a correct portrait of the friendly situation. Efforts taken to deny critical information about friendly forces are called OPSEC. Accordingly, it is the next pillar of C2W we will examine.

Operations Security

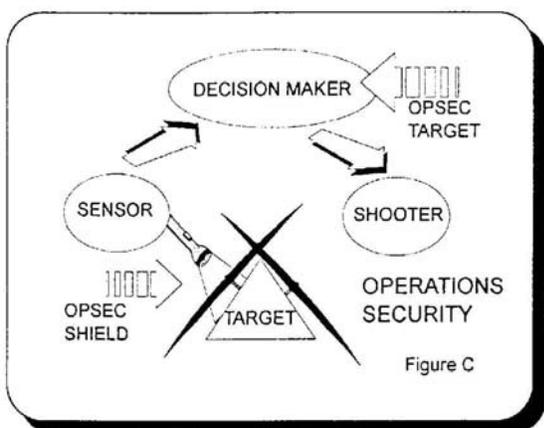
The ultimate in disposing one's troops is to be without ascertainable shape. Then the most penetrating spies cannot pry in nor can the wise lay plans against you.

Sun Tzu, *The Art of War*⁴⁰

OPSEC is vital because as assiduously as we watch the enemy, the enemy watches us. OPSEC is the epitome of C2-protect. Its goal is to ensure that the enemy does not gain an accurate read on friendly operation, dispositions, and intent. Much as military deception seeks to create a false estimate of the situation, OPSEC seeks to ensure an *incompletely accurate* version. Deception and OPSEC work hand in glove; OPSEC protects the truth while deception fills in the blank spaces in the enemy's curiosity with believable lies.

Certain actions, when taken in context to the situation and the capabilities of the force, telegraph intent prematurely. The eye is attracted to movement; a savvy enemy can detect--and therefore sometimes deflect--the blow before it lands. Often it is little indicators, puzzle pieces, that when combined with other indicators, loudly shout "Here I am!" to the enemy. OPSEC's task is to sort through the possible puzzle pieces, determine those that are most ruinous to our scheme if exposed, and obscure them.

OPSEC (Figure C) begins with an understanding that the enemy can see and hear; that is, gather information about us. OPSEC is



therefore concerned with camouflage and concealment, dimming the light and muffling footsteps. It is a process of identifying and analyzing those items of critical information the enemy would most like to obtain,

factoring which of these are observable through his collection means, and instituting measures to reduce friendly vulnerability to collection.⁴¹

OPSEC's biggest challenge lies in the area of unclassified or open source materials or actions. The global village connectivity of the information age heightens the difficulty of OPSEC. A free press operating in an open society can be a fountain of information for the enemy. In August 1870, during the Franco-Prussian War, Prussian Field Marshall Helmuth von Moltke (the Elder) learned of the whereabouts of the French Army courtesy of the Paris press. French general MacMahon's Army of

⁴⁰ Sun Tzu, *The Art of War*, 100.

⁴¹ Joint Publication 3-54, *Joint Doctrine for Operations Security*, (Washington, DC: Joint Chiefs of Staff, August 1991), I-1.

Chalons was caught executing an unexpected operational movement to relieve the city of Metz. Surprise was lost and he was fell upon by Moltke's numerically superior force, and defeated.⁴²

Imagine if von Moltke could have watched his counterpart MacMahon on CNN. What could he have discerned? How *fast* could he have discerned it? Factor in retired generals giving analysis and 'color commentary' and the challenges of OPSEC in the information age become staggering.

Lastly, 'Red Cell' teams simulating a thinking enemy are a crucial component in determining what critical truths must be hidden. The key to OPSEC is to combine knowledge of friendly situation and intent with empathy for the enemy's perspective and of his information gathering capabilities. Knowing what must be protected is the key first step in formulating the entire C2W strategy. OPSEC is the base of the C2W effort. From it flows the integrated efforts of the other pillars.

To this point we have discussed both truth and untruth. In between lies the shadowy world of half-truth. PSYOPS uses bits of the truth to achieve its effect. We will discuss it next.

⁴² Michael Howard, *The Franco-Prussian War: The German Invasion of France 1870-1871*, (New York: MacMillan, 1961), 191-192. Also Field Marshal Count Helmuth von Moltke, *The Franco-German War of 1870-1871*, translated by Archibald Forbes, (London: Harper & Bros., 1914), 71-72. As a side note, MacMahon's movement (vice falling back into the Parisian defensive works), came as a result of emotional editorializing in the French press. MacMahon's earlier, prudent judgment to defend Paris was reversed with ultimately disastrous results. (Howard, 188-189).

Psychological Operations

To seduce the enemy's soldiers from their allegiance and encourage them to surrender is of especial service, for an adversary is more hurt by desertion than by slaughter.

Vegetius, *De Re Militari*, circa 378 A.D.⁴³

Clausewitz observed that a war "...cannot be considered to have ended so long as the enemy's *will* has not been broken."⁴⁴

The Chandler quote at the beginning of this chapter reinforces the notion that the true objective is the psychological aspect of the enemy's will. PSYOPS is that portion of C2W aimed directly at the psychology of the enemy. Its *lingua franca* is a pastiche of half-truths; we will return to this point momentarily.

Joint doctrine correctly asserts that "The employment of any element of national power, particularly the military element, always has a psychological dimension."⁴⁵ However, PSYOPS is more than the calculated recognition of the psychological impact of operations. PSYOPS is a shaping tool where emotions and attitudes are fostered in the enemy to our advantage.

PSYOPS is defined in Joint doctrine as:

"Operations planned to convey selected information and indicators to foreign audiences to influence their attitudes, emotions, motives, objective reasoning, and

⁴³ Vegetius, as quoted in Robert Debs Heinl, editor, *Dictionary of Military and Naval Quotations*, (Annapolis, MD: U.S. Naval Institute, 1966, 3d ed. 1978), 257.

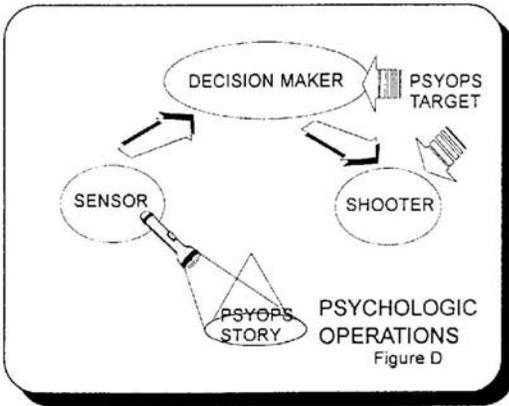
⁴⁴ Clausewitz, *On War*, 90. (Italics in original).

⁴⁵ Joint Publication 3-53, *Joint Doctrine for Psychological Operations*, (Washington, DC: Joint Chiefs of Staff, July 1996), I-1.

ultimately, the behavior of foreign governments, organizations, groups, and individuals."⁴⁶

The key words are *influence, attitudes, and behavior.*

PSYOPS (Figure D) (under the C2-attack function) seeks to create or strengthen enemy perceptions so that his actions are



affected in a way favorable to friendly purposes. PSYOPS is a soft kill on the enemy's decision process and includes undermining of his forces by sowing "dissidence or disaffection"⁴⁷

amongst his ranks. PSYOPS seeks to convince the enemy to do, or not to do, some action of his own volition; it is a persuasive attack.

PSYOPS is talking to the enemy. It is a non-lethal way to multiply the effects of military capabilities through the direct communication of information to the enemy. The military form of propaganda, an effective PSYOPS campaign communicates our resolve and/or capabilities as superior to that of the PSYOPS target. A simple example is the appearance of a well-equipped, highly disciplined body of troops in front of an assembled mob; the bright flash of bayonets and the unitary crash of the manual of arms conveys a psychological message: stand down or be crushed.

⁴⁶ Joint Pub 3-53, *PSYOPS*, I-1.

⁴⁷ Joint Pub 3-53, *PSYOPS*, I-1.

At the strategic level of war, PSYOPS is very much an aspect of deterrence. During the Cold War the credible U.S. nuclear threat buoyed our various retaliatory strategies. Deterrence is a form of PSYOPS in its C2-protect mode. At the operational level, classic naval presence missions or show of force operations directly communicate national interest, resolve, and capabilities. Leaflet drops, radio broadcasts, and loudspeakers blaring all manner of sounds from tank noises to Wagner's *The Ride of the Valkeries* are examples of tactical level PSYOPS. The essence of PSYOPS is presenting the enemy information (that is, entering into his decision process) that causes him to react in a desired way.

Successful PSYOPS campaigns and messages have specific characteristics. First, the intended outcome supports the wider mission. Second, the PSYOPS message is believable and verifiable by the enemy through his own means. Third, careful crafting is essential; PSYOPS is a persuasive truth project. Cultural intelligence and careful analysis of the adversary are necessary before the fact. Effective PSYOPS campaigns consider the enemy's viewpoint, observations, and issues. Fourth, constant feedback and analysis ensure PSYOPS' continuous efficacy towards the mission.

The believability of the PSYOPS message raises an important distinction between PSYOPS and military deception. These two facets of C2W are complimentary opposites. Distinguishing PSYOPS

is that it is truth-based, although the *whole* truth is not always used. PSYOPS aids military deception operations by providing that part of the deception that is real. PSYOPS 'sets the hook'; deception administers the sting. It can "magnify and multiply the effects of deception."⁴⁸ PYSOPS, like all the pillars of C2W, is a combinable arm.

The psychological aspect of the enemy's will, the target of PSYOPS, is found both in the mind of the enemy commander and in the individual minds of his soldiery. At a minimum, each man commands his own body, no matter how small his circumstances. While certainly convincing the enemy commander that the cause is lost has more efficacy than convincing the lowest private in ranks, the effect is the same. The enemy does not fight as efficiently. That loss of combat power aids the friendly cause. Achieving that point is the aim of PSYOPS.

Mass media techniques are often used to convey the PSYOPS message, to include broadcast media. Reaching the enemy's ears through the electromagnetic spectrum is just one way to get the PSYOPS message delivered. Many other military functions use the electromagnetic spectrum. High use of this medium is a characteristic of modern operations and of the Information Age. Not surprisingly, modern war contains a contest for control of the electromagnetic spectrum. The battle is known as electronic

⁴⁸ Joint Pub 3-13.1, C2W, II-4.

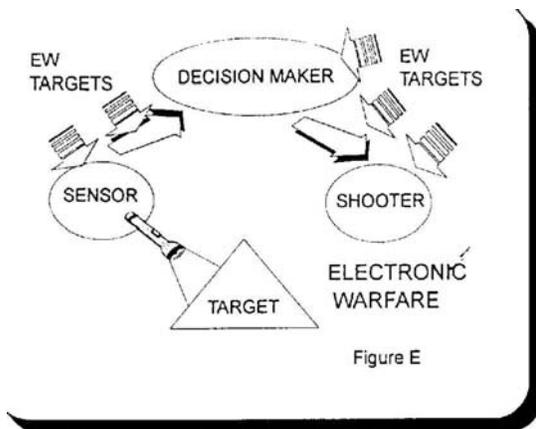
warfare and is the next component of C2W we will address. This point also marks our shift from truth-related C2W to C2W efforts that concentrate on the physical portions of decision-making.

Electronic Warfare

In order to progress, radio only needs to go backwards to the time... when radio was rather proud, alert and fast.

Edward R. Murrow, 1958⁴⁹

The prominent newsman Edward R. Murrow, whose career saw the advent of both radio and television journalism, was *not* talking about electronic warfare (EW) when he offered the above observation. He was talking about the electronic media, yet from his words come two cogent observations about EW. First, EW has been with us in some form as long as we have used the electromagnetic spectrum--since the birth of radio in the mid-1890s; and second, successful EW renders friendly use of the electromagnetic spectrum "proud, alert and fast."



EW (Figure E) is defined as "any military action involving the use of electromagnetic and directed-energy to control the electromagnetic spectrum

⁴⁹ Edward R. Murrow, in a speech presented at the Radio and Television News Directors Convention, Chicago, IL, 15 October 1958, quoted by John Bartlett, *Familiar Quotations*, (Boston, MA: Little, Brown & Co., 14th ed., 1968), 1064A.

or to attack the enemy."⁵⁰ EW has three subdivisions: electronic attack (EA), electronic protection (EP), and electronic warfare support (ES).

EA is the striking arm of EW. Formerly called electronic countermeasures (ECM), EA employs electromagnetic or directed-energy against adversary personnel, facilities and equipment that use the electromagnetic spectrum. Yoked to the C2-attack function, soft kill expressions of EA include jamming and electromagnetic deception. Hard kill options include antiradiation missiles or electromagnetic and directed-energy weapons such as lasers and particle beams.⁵¹

EP is the shield of EW. Answering to the C2-protect requirement, EP defends friendly forces against adversary EA. Once called electronic counter-countermeasures (ECCM), EP deconflicts communications frequencies so that friendly EA activities (such as jamming) do not adversely effect friendly C2.⁵² EP is a factor included in EW planning when the enemy possesses any EW capability.

ES is the tactical expression of EW for the operational commander. Its purpose is immediate recognition of the enemy's use of the electromagnetic spectrum. It is tied to signals intelligence, communications intelligence, and electronic

⁵⁰ *Joint C2W Staff Course: Student Text*, 10-3 - 10-4.

⁵¹ Hutcherson, *C2W*, 26.

⁵² *Joint C2W Staff Course: Student Text*, 10-4

intelligence: it is a collector not a source of cogent analysis or evaluation.⁵³ ES serves as electromagnetic 'eyes and ears.' It is a sensor in the 'sensor to decision-maker to shooter' path discussed in the previous chapter.

EW efforts, composed as they are of EA, EP, and ES, are sophisticated and highly technical, and are the aspect of C2W most related to hardware and systems. The fixed size of the electromagnetic spectrum, shared by the three components of EW and by the enemy, further complicates EW efforts. As proof, consider the Joint Communications-Electronic Operating Instructions (JCEOI) produced in over twelve editions by the U.S. National Security Agency (NSA) for Operation Desert Storm. Ultimately, the JCEOI totaled over a half million pages and weighed in at 85 tons.⁵⁴

The 'science fiction or fact' nature of EW leaves many confused, yet the outcome of the EW battle is the most directly measurable of the C2W pillars. Winners transmit, losers do not. Control of the 'electronic' line of communications results.

Successful EW, more than any other function of C2W, cuts the connective nerves of the adversary body. It most directly achieves the 'decapitation of the enemy's command structure from its combat forces' goal of C2W.

⁵³ Hutcherson, *C2W*, 26.

⁵⁴ Donald L. Jones and Richard C. Randt, "The Joint CEOI", in *The First Information War*, 162.

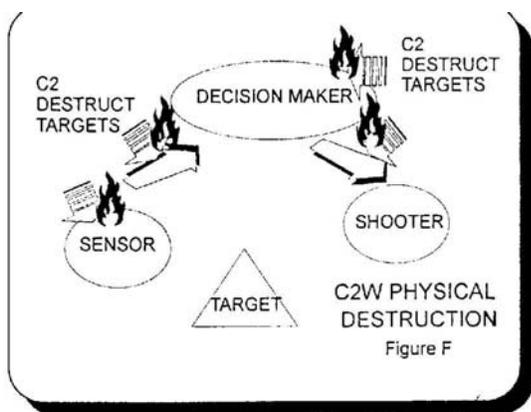
Exploitation of the electromagnetic spectrum has been this century's addition to C2W. One aspect of C2W, C2W physical destruction, employs the more traditional means of combat-- physical destruction--to achieve its aims. It is the next, and last, pillar of C2W we will discuss.

C2W Physical Destruction

Superior force is a powerful persuader.

Winston Churchill: Note to the First Sea Lord, 15 October 1942⁵⁵

C2W physical destruction is the use of traditional modes of firepower in pursuit of C2W goals. As a target set, C2W physical destruction (Figure F) generally concentrates on C2 nodes and sensors although it may be employed in support of the other pillars of C2W. As a means, therefore, it is defined as "the use of 'hard kill' weapons against designated targets as an element



of the integrated C2W effort."⁵⁶

C2W destruction depends on the ability to locate and identify targets that if neutralized, degrade the enemy's decision process. This

includes attacking hardware (sensors and communications systems) as well as command posts and

⁵⁵ Winston Churchill, as quoted in Heinl, *Military and Naval Quotations*, 121

⁵⁶ Joint Pub 3-13.1, *C2W*, II-7.

the actual decision-makers themselves. The later point is simply demonstrated by recalling the age-old practice of aiming for the enemy's officers first. Other examples include cutting telegraph wires or raiding the enemy's command post. C2W destruction captures the fact that it is often of practical value to physically destroy, neutralize, suppress and harass your enemy's C2.

C2W destruction belongs not as much to information war theory as it does to traditional targeting. C2W destruct targets serve C2W much as preparatory fires serve maneuver. The information age's impact on how we organize and conduct war changes little the cogency of knocking out your enemy's key capabilities. As the Churchill quote at the beginning of this section testifies, sometimes force *is* a powerful persuader.

To this point we have discussed the individual pillars of C2W, yet the key to the successful implementation of C2W is the integration of all its aspects. We will examine that next.

The Greater Whole of C2W

The pillars of C2W are inextricably intertwined. PSYOPS serves military deception and *vice versa*, both enhance OPSEC by distracting the enemy's attention. EW and C2W physical

destruction also support each other--picture a HARM missile following the 'electrons' back to their source to destroy the emitter--as well as supporting the other pillars. In fact, it is difficult to find examples of each of the pillars that *do not* involve the other aspects of C2W. This is logical, for in the 'sensor to decision-maker to shooter' model, it is impossible to separate truth (the moral) from the means that carry it (the physical). An attack on one, effects all.

C2W as a strategy demands the integration of all its parts in order to reach its full potential. The pillars are combinable in both design and function. The way of the past has been a haphazard appreciation for the way the pillars inter-related, this will not be acceptable in the information age. Failure to deliberately plan and follow a C2W strategy integrating all the pillars invites the loss of information superiority and defeat. Let us consider an example of the power of integrated C2W involving PSYOPS, military deception, EW, and OPSEC. We return to WW II.

As 1943 became 1944 in the European Theater of Operations, Germany anticipated a cross-channel invasion of France. The location and date of the planned Overlord landings were the OPSEC jewel to be protected, yet the Germans had the ability to gather information about the burgeoning Allied invasion force and its preparations. Deception was called for in order to hide the real operational objective--Normandy.

The actual effort combined PSYOPS and deception and was carried on, in part, through EW. Several deception plans (Bodyguard, Quicksilver, and Fortitude) painted a portrait that an invasion army under General George S. Patton was forming in southeastern England opposite the most likely invasion site of Pas de Calais. The location of the force opposite the Pas de Calais (the closest point in France across the English channel) seemed logical. Further, as in the German view Patton was the likely commander, the deception story had merit. An entirely fictitious First U.S. Army Group of more than fifty divisions, portrayed through false radio traffic, completed the 'believable' picture. Patton himself--never without luster--made visible public appearances and was often in the press, and was therefore "seen" to command an army that did not exist.⁵⁷

The sum effect was operational surprise. The initial landings at Normandy were considered by the Germans to be a feint. German operational reserves were held back awaiting Patton's 'real' landing at Pas de Calais.⁵⁸ The successful deception confused the Axis for several weeks; as a result operational and tactical surprise were achieved in Normandy.

The whole of C2W exceeds the sum of each of the parts. Integrating the pillars of C2W is how to wage successful C2W.

⁵⁷ Anthony Cave Brown, *Bodyguard of Lies*, (New York: Harper and Row, 1975), 1: 511, 2: 532-536.

⁵⁸ John Keegan, *The Second World War*, (New York: Penguin Books, 1989), 373-378. Also, LeHockey, *Military Deception*, 52-58.

Having laid out the pillars of C2W individually and collectively, discussed their nature, and highlighted the criticality of C2W in achieving information superiority, we will next examine a case study. The purpose of our study will be to analyze through historical example the effect of the integrated pillars of C2W. In Chapter Three, we will examine C2W in Operation Desert Storm.

CHAPTER THREE

...in Desert Storm, *knowledge* came to rival weapons and tactics in importance, giving credence to the notion that an enemy might be brought to his knees principally through destruction and disruption of the means for command and control.

Alan D. Campen, *The First Information War*⁵⁹

Operation Desert Storm and C2W

Militarily, Operation Desert Storm was a rout for the US and its coalition allies. The first major military conflict after the end of the Cold War, Operation Desert Storm has been variously characterized as "without precedent in the annals of warfare,"⁶⁰ "inconsequential, even slightly ridiculous... a footnote, a conflict as distant as the Boxer Rebellion of 1900,"⁶¹ and "hollow".⁶² Disputes over the character of the victory aside, what is indisputable is that the fourth largest army in the world was smashed in just six weeks and that US and coalition casualties were remarkably low.⁶³ Iraqi forces, despite their battle hardening in the Iran-Iraq War, were no match for the U.S. led whirlwind. Why? Part of the answer may be found in the U.S. use of a strategy of C2W to decapitate the Iraqi war machine.

⁵⁹ Alan D. Campen, "Introduction," in *The First Information War*, x.

⁶⁰ Michael R. Gordon and General Bernard E. Trainor, *The General's War: The Inside Story of the Conflict in the Gulf* (Boston, MA: Little, Brown and Company, 1995), x.

⁶¹ Rick Atkinson, *Crusade: The Untold Story of the Persian Gulf War* (Boston, MA: Houghton Mifflin Co., 1993), 4-5.

⁶² Jeffrey Record, *Hollow Victory: A Contrary View of the Gulf War* (Washington DC: Brassey's (US), Inc., 1993), 1.

⁶³ *Conduct of the Persian Gulf War: Final Report to Congress*, (Washington DC: Department of Defense, April 1992), xiii.

In Desert Storm, C2W was a rousing success and a key factor in the swift nature of the Coalition's triumph. This chapter will look at and analyze Operation Desert Storm from a C2W standpoint. The intent is to demonstrate C2W's criticality in the rout of the Iraqis, and through specific historical example, confirm C2W's value as a military strategy. Operation Desert Storm is chosen as the example because it is, in my view, the first war of the information age.

Alan D. Campen, editor of a collection of essays concerning communications, computers, and intelligence systems in ODS, first proposed that the outcome of ODS, "turned as much on superior knowledge as it did upon performance of people and weapons."⁶⁴ This contention supports the position taken earlier in this work, namely that the collision of information age technologies and the ancient quest for information superiority have produced a dramatic new way to wage war. Using advanced technologies--and the pillars of C2W--Coalition Forces created an informational differential that was the key to rapid victory. U.S. Air Force Colonel Edward Mann does not disagree. Citing the increased relevance of the struggle to dominate the enemy in terms of information and knowledge in modern warfighting, he unequivocally links ODS with information warfare. Using Tofflerian terms, he credits "the overwhelming defeat" of Iraq to the fact that

⁶⁴ Alan D. Campen, "Preface", in *The First Information War*, vii.

"Saddam Hussein's industrial-era armed forces ran up against a post-industrial [that is, information age] military whirlwind."⁶⁵

Our central thesis of this work is that waging successful information war is how wars will be won in the future and that winning the C2W battle is how military forces wage successful information war. This said, let us now return to C2W in ODS. We will begin with an overview of strategic planning as Desert Shield transitioned to Desert Storm.

Operation Desert Storm: The Plan

Once the decision to intervene in the crisis was taken, the US National Command Authority (NCA) recognized the potential need to forcibly dislodge the Iraqis from Kuwait. Accordingly, General H. Norman Schwarzkopf USA, Commander-in-Chief (CINC), US Central Command (CENTCOM), was tasked by the NCA to develop an offensive strategy. On 25 August 1990, General Schwarzkopf briefed the President, the Secretary of Defense, and the Chairman of the JCS on a four-phase campaign designed to provide a multiple axis, coordinated air, ground and naval campaign.⁶⁶

Phase I was a strategic air campaign against Iraq. Phase II attacked Iraqi air forces in Kuwait. Phase III changed the target to Iraqi ground combat units (specifically the elite Republican Guard) with a design of attriting enemy ground combat power and isolating the Kuwaiti battlefield. Finally, Phase IV

⁶⁵ Edward Mann, "Desert Storm: The First Information War?", *Airpower Journal*, Vol. 8, No. 4 (Winter 1994): 5.

⁶⁶ *The Conduct of the Persian Gulf War: Final Report to Congress*, 66.

was a ground offensive to expel Iraqi forces from the physical limits of Kuwait. These phases were to remain essentially the same throughout the conduct of the Gulf War, minor semantic changes notwithstanding.⁶⁷ It was a blueprint for victory, a cogent way of organizing Coalition effort.

On the surface, Schwarzkopf's four phases were not revolutionary. Strategic air campaigns, the initial phase, were fought during World War II and continued on after as a hallmark of Cold War planning; embodied, of course, in the U.S. Strategic Air Command. The middle two phases, gaining air superiority and attriting the enemy's ground forces, also were not departures. They are traditional measures taken prior to any ground campaign--Schwarzkopf's fourth phase. To understand how C2W was integrated with ODS strategy, we must peer inside General Schwarzkopf's intent.

Commander's Intent and C2W

At the same 25 August briefing, General Schwarzkopf presented his intent for the offensive campaign. It included what we now call C2W concepts as integral to his scheme, as noted in bold [emphasis added]:

"We will offset the imbalance of ground combat power by using our strength against his weakness. Initially, **execute deception operations** to focus his attention on defense and cause incorrect organization of forces. We will initially attack into the Iraqi homeland using air power **to decapitate his leadership, command and control** and eliminate his ability to reinforce Iraqi forces in Kuwait and southern

⁶⁷ For example, phase II became 'Air Supremacy in the KTO (Kuwaiti Theater of Operations)' while phase III became 'Battlefield Preparation.' See *The Conduct of the Persian Gulf War: Final Report to Congress*, 68-69 (inset).

Iraq. We will then gain undisputed air superiority over Kuwait so that we can subsequently and selectively attack Iraqi ground forces with air power in order to reduce his combat power and destroy reinforcing units. Finally, **we will fix Iraqi forces in place by feints and limited objective attacks** followed by an armored force penetration and exploitation to seize key lines of communication nodes, which we will put us in a position to interdict re-supply and remaining reinforcements from Iraq and eliminate forces in Kuwait."⁶⁸

C2W concepts are prominent in Schwarzkopf's intent. The military deception and C2W physical destruction pillars of C2W leap from the page. The inclusion of decapitation of leadership and C2 systems as goals intrinsically embrace C2W. C2W pillars were to be used to shape the battlefield environment in a decisive way; from this would come information superiority.

Information Superiority in ODS

In JV 2010 terms, General Schwarzkopf was seeking information superiority. As further proof, consider this unclassified extract from his operations order:

"(u) **The basic targets are...**the enemy's command and control capability and all supporting information. In broad terms these include the equipment, people perceptions, functions and processes which facilitate **the enemy commander's decision making and control of forces.** [emphasis added]"⁶⁹

Schwarzkopf's intent was realized and the Coalition attained information superiority in ODS. Coalition planners benefited from remarkably clear pictures of the enemy's dispositions,

⁶⁸ *The Conduct of the Persian Gulf War: Final Report to Congress*, 66 (inset).

⁶⁹ Headquarters, U.S. Central Command, Riyadh, Saudi Arabia, *Paragraph 1 (Situation), Appendix 4 (C3CM), Annex C (Operations) to Operation Desert Storm*, 16 December 1991: C-4-3. The Desert Storm Operations Order has not been declassified, however certain aspects of it, as above, were never classified.

gained mostly through dominance of both the air (enabling platforms like JSTARS and AWACS to perform, as well as photo-reconnaissance assets) and the electromagnetic spectrum. Contrastingly, no Iraqi aircraft ever overflew U.S. forces. Further, successful EW prevented Saddam's ears from compensating for the blindness of his eyes. U.S. satellite systems, aided by the desert conditions, produced exceptional imagery throughout the conflict. Divination and analysis of Iraqi intentions, especially at the strategic level, experienced difficulty due the lack of human intelligence sources, however the Coalition generally knew where the enemy was in excellent detail.⁷⁰

Coalition attacks on Iraqi C2 using both hard-kill and soft-kill means further widened the information gap. What Iraqi sensors perceived could not always get through to the decision-makers for analysis and decision; transmission to shooters was likewise degraded. What the sensors perceived--those sensors left operating--was often false, leading to an incorrect estimate of the situation and bad decisions. The resulting asymmetrical battlespace awareness led to decisive defeat for Iraq.

How decisive? Beside the blinding rapidity of the 100-hour ground campaign, Coalition casualties were remarkably low. Stephen Biddle tells us:

⁷⁰ Angelo Codevilla, *Informing Statecraft: Intelligence for a New Century* (New York: The Free Press, A Division of Macmillan, Inc., 1992), 275-282.

"In less than six weeks, 795,000 Coalition troops destroyed a defending Iraqi army of hundreds of thousands, losing only 240 attackers. This loss rate of fewer than one fatality per 3,000 soldiers was less than one tenth of the Israeli's' loss rate in either the 1967 Six-Day War or the Bekaa Valley campaign in 1982, less than one twentieth of the Germans' in their blitzkrieg against Poland or France in 1939-40, and about one one-thousandth of the U.S. Marines' in the invasion of Tarawa in 1943."⁷¹

In short, by the measure of cost as compared to scale, the Gulf War was amongst the most lopsided in history. This occurred despite the survival of Iraqi armor in significant numbers prior to the start of the ground war.⁷² Opinions and observations over

⁷¹ Stephen Biddle, "Victory Misunderstood," *International Security*, Vol. 21, No. 2 (Fall 1996), 142.

⁷² The Gulf War Airpower Survey states that about 2,000 Iraqi tanks and 2,100 other armored vehicles survived the air campaign and were potentially able to resist the Coalition ground attack of 24 February. Attrition rates varied by units, averaging 48% in tanks, 30% in APCs and artillery to about 60%. Some units were 100% attrited. (Eliot A. Cohen and others, *The Gulf War Airpower Survey*, 5 Vols., (Washington, DC: Office of the Secretary of the Air Force, GPO, 1993), 2: 170, 214, 218-219). Biddle cites these numbers ("Victory Misunderstood", 149), as well as pointing out that even a conservative estimate of a 1200 Iraqi tanks represents more tanks than possessed by the entire Israeli army in 1967. ("Victory Misunderstood", 152).

the quality of the Iraqi forces and commanders aside,⁷³ there is a direct linkage between the stunning success and the employment of C2W concepts to gain information superiority.

Let us now turn more specifically to how C2W concepts contributed to the rapid decision and one-side victory over Iraq. The next section offers the historical evidence.

C2W in ODS

The objective of this section is two-fold: 1) to demonstrate the operational lethality of integrated C2W; and 2) to demonstrate that the successful execution of C2W strategy-- leading to information superiority--was a primary reason for the Coalition's speedy and lopsided victory over Iraq.

To demonstrate the above, only selected examples will be discussed. The interwoven pillars of C2W were in harness continuously throughout the Gulf War⁷⁴, and it is beyond the scope of this work to catalog them all. Therefore, to demonstrate my points, I have chosen two major examples of decisive C2W in ODS. The first is physical: the 'anti-head' and 'anti-neck' strategic air campaign. The second is moral: the elaborate military deception campaign that completely mystified the Iraqis as to where the Coalition land forces would strike.

⁷³ Biddle attributes the lopsided victory in the Gulf to a "synergistic interaction between a major skill imbalance and new technology." ("Victory Misunderstood", 149) I do not disagree, however the coalition's information superiority, created in part by superior technology employed in accordance with C2W concepts, must be included in any accounting of skill differential. A blind boxer is not as effective as a sighted one, and Biddle neglects this point in his recounting of Iraqi deficiencies.

⁷⁴ This despite the CENTCOM Operations Order spreading "C2W" direction over four separate annexes and six different appendixes. See the bibliography.

The first example attacked the brain and nervous system of the Iraqi war machine, the second dizzily spun its attention about, causing it to be off-balance and maloriented--ripe for the knockout punch. Their interaction was decisive. We will begin with the strategic air campaign.

Douhet's Dream Refined: Airpower in ODS

No discussion of ODS would be complete if it did not recognize the dramatic effect of Coalition airpower. A world-wide audience sat entranced in front of their televisions as the first bombs fell on Baghdad just before 3 a.m. local time on 17 January 1991. Desert Storm had begun.

The initial airstrikes were part of a dedicated campaign to "silence Saddam -- to destroy his ability to command the forces arrayed against ours."⁷⁵ Code named "Instant Thunder", the strategic air campaign's first objective was to "isolate and incapacitate the Iraqi regime" by attacking its leadership command facilities, electrical production infrastructure, telecommunications, and C3 systems.⁷⁶ It was the brainchild of Air Force Colonel John Warden and his 'Checkmate' planning staff. Instant Thunder was based upon Warden's vision of the enemy as a system of

⁷⁵ H. Norman Schwarzkopf with Peter Petre, *General H. Norman Schwarzkopf: The Autobiography: It Doesn't Take a Hero* (New York: Bantam Books, 1992), 318-319.

⁷⁶ *The Conduct of the Persian Gulf War: Final Report to Congress*, 96-97. Also Williamson Murray, *Air War in the Persian Gulf* (Baltimore, MD: The Nautical & Aviation Publishing Company of America, 1995), 101.

five rings. The center ring in his vision is the leadership of the enemy--the center of gravity to be attacked with airpower.⁷⁷

Forty-five 'Leadership command facilities' were in Baghdad alone, with others scattered throughout the country. The desired end-state was the fragmentation, disruption and degradation of the enemy's decision process.⁷⁸ Targets struck the first night, in demonstration of their importance, included the Baghdad International Telephone Exchange (dubbed the AT&T building), the Presidential Palace command center and bunker, the Ministries of Defense, Intelligence and Propaganda, as well as the headquarters of the Iraqi Air Force, Secret Police, Republican Guard, Baath party, and National Air Defense.⁷⁹

The strategic air campaign was nothing less than a dedicated attack on the central nervous system of Iraq.⁸⁰ It was C2W physical destruction employed at both the head of the enemy, but also at its 'neck'; that is to say, its ability to receive information and transmit direction. Other pillars of C2W were employed--especially EW--at the tactics, techniques, and procedures level. A U.S. Army attack helicopter raid on Iraqi

⁷⁷ Gordon and Trainor, *The General's War*, 79-94. Also John A. Warden, "The Enemy as a System" *Airpower Journal*, Vol. 9, no. 1 (Spring 1995): 40-55, and Richard T. Reynolds, *Heart of the Storm: The Genesis of the Air Campaign Against Iraq*, 2 vols. (Maxwell Air Force Base, AL: Air University Press, 1995).

⁷⁸ *The Conduct of the Persian Gulf War: Final Report to Congress*, 96-97.

⁷⁹ James P. Coyne, *Airpower in the Gulf* (Arlington, VA: Air Force Association, 1992), 3-11.

⁸⁰ Herman L. Gilster, "Desert Storm: War, Time, and Substitution Revisited," *Airpower Journal*, Vol. 10, No. 1 (Spring 1996): 89. Gilster cites Cohen and others, *The Gulf War Airpower Survey*, 2: 274-290.

air warning radars on the first night of the war, credited with "cutting the keyhole" for the air campaign, is an example of C2W aimed at sensors.⁸¹

The destruction of the Iraqi Air defense system ('Kari' or Iraq backwards in French) is an example of C2W destroying the enemy's capabilities from the inside out. By breaking the connections between air defense sites, the entire system was burdened. The strike at the central node was designed to paralyze the overloaded system by incapacitating the decision-maker at the moment of greatest need. The result was an ineffective and uncoordinated air defense effort, and ultimately, the surrender of the contest for air superiority before it had begun.⁸²

Some debate lingers over whether Instant Thunder was fully effective. The U.S. Air Force Institute believes it was, and that it effectively cut Saddam off from his forces, blinded him to Coalition moves, and silenced him from providing active

⁸¹ Atkinson, *Crusade*, 17-19, 31-33.

⁸² Williamson Murray, *Air War in the Persian Gulf* 103-104. Also Alan D. Campen, "Iraqi Command and Control: The Information Differential", in *The First Information War*, 176.

strategic, operational or tactical direction.⁸³ Dr. Herman Gilster believes the impact was questionable, noting that although Iraqi C2 was degraded, the dedicated air attacks did not succeed in either toppling the regime or completely severing communication with forces inside the KTO.⁸⁴ This criticism misses the point, for neither was an objective of the campaign. The real objective was to degrade--not destroy--the enemy's decision loop, thus allowing the Coalition to "OODA" faster than the Iraqis.

Perhaps the best proof may come from the Iraqis themselves. At the Safwan cease fire talks at the end of the ground war, Iraqi generals were shocked at the amount of POWs taken and at the extent of the territory captured.⁸⁵ Their surprise does not suggest an accurate understanding of the situation. Alan D. Campen cites Iraqi POWs revealing that "...intelligence officers used Radio Saudi Arabia...and the Voice of America as sources to brief Commanders."⁸⁶ In the final measure, the numerous instances of uncoordinated and ineffective Iraqi military efforts at levels from highest to lowest, speak eloquently about the decisive success of the C2W attack on the head and neck of Iraq.

⁸³ U.S. Air Force Institute, "The Institute Responds," in Martin van Creveld and others, *Air Power and Maneuver Warfare* (Maxwell Air Force Base, AL: Air University Press, 1994), 229-230.

⁸⁴ Gilster, "Desert Storm: War, Time, and Substitution Revisited": 89.

⁸⁵ Atkinson, *Crusade*, 8. Also Schwarzkopf, *Autobiography*: 488-489.

⁸⁶ Campen, "Iraqi C2: The Information Differential", in *The First Information War*, 172.

Italian air power theorist Giulio Douhet dreamed of fleets of bombers attacking enemy population centers, government, and industry. Sailing over the horrors of the trenches, airpower would be the decisive arm of warfare.⁸⁷

In Desert Storm, through the targeting philosophy of C2W, his dream may have been finally vindicated."⁸⁸ This explains the U.S. Air Force's embrace of Information Warfare as a Revolution in Military Affairs, as their ODS experience attacking the C2W target set validates their service ethic, derived from Douhet and Mitchell, concerning the primacy and decisive character of airpower.

In the first example, we have discussed the physical destructiveness of C2W. The Air Force is justifiably proud of their performance in ODS, yet C2W encompasses more than C2W physical destruction. Next we will review a decisive example of C2W's moral aspect.

Tricking the Devil: Military Deception in ODS

As shown earlier in this chapter, Schwarzkopf's intent statement called for deception to "focus his attention on defense and cause incorrect organization of forces."⁸⁹ What CINCENT wanted was Saddam Hussein's incorrect estimate of the situation

⁸⁷ David MacIsaac, "Voices From the Central Blue: The Airpower Theorists," in *Makers of Modern Strategy: Machiavelli to the Nuclear Age*, Peter Paret, ed. (Princeton, NJ: Princeton University Press, 1986), 626.

⁸⁸ John F. Jones, Jr., "Giulio Douhet Vindicated: Desert Storm 1991," *Naval War College Review*, Vol. XLV, No. 4 (Autumn 1992), 97-101.

⁸⁹ *The Conduct of the Persian Gulf War: Final Report to Congress*, 66.

as it pertained to Coalition ground attack options. If achieved, the subsequent Iraqi force disposition plan would expose Saddam's flank to the left hook of the ground campaign. Schwarzkopf needed to focus Saddam's attention away from the west. The danger was real; if the repositioning of the U.S. XVIII Airborne and VII Corps--over 100,000 thousand troops and 1,200 tanks an average distance of 200 miles--was to be observed, the planned ground scheme of maneuver would be compromised and operational surprise lost. A properly executed deception plan would make Saddam look in the wrong direction--away from where the hook would be launched--and position his defense accordingly. From this need came a plan that integrated all the pillars of C2W in the service of deception.

The deception effort was multi-faceted. In the Persian Gulf, a series of large, well-publicized, amphibious exercises entitled 'Sea Soldier (I-IV)' and 'Imminent Thunder' showed Saddam Hussein a creditable threat on his eastern flank. Involving over twenty-one thousand Marines and sailors embarked in forty amphibious ships, it was the largest amphibious force afloat post-Inchon. Aiding the cause, *Newsweek* magazine dedicated a feature article to a planned amphibious invasion in the middle of February.⁹⁰ U.S. Navy SEALs conducted beach reconnaissance in Kuwait and got into firefights with Iraqi

⁹⁰ Tom Post, with John Barry and Douglas Waller, "To The Shores of Kuwait", *Newsweek*, Vol. 117, No. 6, February 11, 1991, 28-29.

coastal defenders.⁹¹ Also, air and surface battlefield preparatory fires remained concentrated in the KTO until just prior to 24 February.

All this activity could not be ignored and Saddam did not ignore it. His focus stayed to the east and to the coast, including the "shifting of several divisions and hundreds of heavy guns to reinforce Kuwaiti beaches."⁹² Somewhere between 8 to 11 divisions stayed oriented on the coast, their attention fixed in the wrong direction.

The amphibious deception looked real because for a while it was real. Michael Gordon and Bernard Trainor have classified it "deception by default" because it was not until early February, 1991 that the real amphibious option was dismissed.⁹³ This characterization may be harsh. It is likely Schwarzkopf retained an amphibious option for any of a combination of practical, political, and deceptive purposes. However, the truthful aspect of the amphibious option--springing from whatever source--speaks to PSYOPS, and the combination of PSYOPS with deception, even deception by default, proved very effective.

Ashore, in the blank spaces of the Iraqi's attention, XVIII Airborne and VII Corps were meanwhile moving west into their eventual attack positions. A Potemkin Village built electronically through false radio traffic, electronic emissions,

⁹¹ Atkinson, *Crusade*, 369-370.

⁹² Atkinson, *Crusade*, 169-173.

⁹³ Gordon and Trainor, *The General's War*, 294.

and run by a small force at Forward Operating Base Weasel, signaled the false presence of both Corps due south of Kuwait. Computers routed messages, loudspeakers offered sound recordings, smoke generators made dust clouds. The message for the Iraqis was that the Coalition intended an attack into Kuwait from the South.⁹⁴ Stringent OPSEC protected the real plan, despite a published *Newsweek* projection of the likely ground war that depicted the actual ground scheme of maneuver with astonishing veracity.⁹⁵

In support of the deception plan, XVIII Airborne Corps feinted in divisional strength into the likely attack avenue of the Wadi al Batin, made contact and took casualties before withdrawing. The fixing attack, paid for in blood, supported the overall ruse that the Coalition was coming straight into the Saddam Line in southern Kuwait. The attack was credible because of the casualties; the Iraqis perceived it as a probing attack for the expected main thrust. As a result, four Iraqi Divisions

⁹⁴ Thomas M. Huber, "Deception: Deceiving the Enemy in Operation Desert Storm," in *Combined Arms Battle Since 1939*, Roger J. Spiller, ed., (Fort Leavenworth, KS: U.S. Army Command and General Staff College Press, 1992), 59-65.

⁹⁵ Charles Lane, and others, "The Killing Ground", *Newsweek*, Vol. 117, No. 4, January 28, 1991, 28-31.

were re-positioned to block the Wadi.⁹⁶ The deception was successful as "false sensing" led to shifted forces.

The combined effect of the deception effort was to render the Iraqi offense off-balance and poorly positioned. PSYOPS, EW, OPSEC, and C2W physical destruction combined to make the deception believable and effective. When the left hook launched, the boxer was looking the wrong way and his guard was down. C2W materially enhanced the effect of the blow. The armored fist was a first round haymaker because the enemy never saw it coming.

C2W in ODS: Decisive

In ODS, the Coalition's information superiority gained through successful C2W was decisive. The Iraqis were rendered off-balance and susceptible to dramatic defeat. The conduct of the culminating ground campaign was not a fair fight, nor were the preceding three phases. From the very beginning, C2W concepts animated Coalition planning and execution. The C2W target set, attacked as a first priority with both hard kill and soft kill means, caused an information differential between the adversaries that could not be overcome. The C2W strategy, supported by superior technologies, leadership, and soldiery operating under an umbrella of information superiority, produced the most lopsided victory in modern history. At the operational and tactical level, it is a model of successful warfare in the information age.

⁹⁶ Atkinson, *Crusade*, 332-333. Also Robert H. Scales and others, *Certain Victory: The United States Army in the Gulf War* (Washington, DC: Office of the Chief of Staff of the United States Army, 1993), 200-207.

CHAPTER FOUR

What to Make of All of This

Building on the three previous chapters, four main points thrust themselves forward. These points are: 1) The new battlespace; 2) The impetus to change; 3) The prize; and 4) The key to victory. Each point builds on the previous one and combines into a single argument for war is a seamless web. All serve the jealous mistress of victory. We will address each in turn, beginning with the new battlespace.

The New Battlespace

The arrival of the information age is irreversible. Information age trends--increased sensor output and capability, speed of transmission, stress on the Napoleonic staff model, and dependency on information systems to wage war--will continue their sine wave climb. New capabilities will rise from trough to the wave top to achieve the potential of new technologies. The adverse impacts of the information age on military operations will be negated. A way will be found to prevent overwhelming the decision process through volume, hierarchies will flatten to more efficiently share information. Real time awareness will be increasingly available.

All the above trends are underway now. We will embrace them or suffer the consequences. Information has become a fifth dimension, taking its place along earth, sea, sky, and time. As we embrace its possibilities, we will not be able to avoid our increasing dependence--and therefore vulnerability--on information

systems and 'system-of-systems' to wage war. From this dependence flows the first point: the battlespace of the information age will be information systems and the military information path of 'sensor to decision-maker to shooter.' The struggle in this new battlespace will be to protect one's own information systems and path while attacking the enemy's. We will have to continue to change to win this struggle. The reason to do so is our next point.

The Impetus to Change

The impetus to change is simple. Operation Desert Storm points out the one-sided outcome of the military collision between industrial age forces and those with information age technologies in harness. The impetus to change therefore is the opportunity to gain asymmetric real-time situational awareness, or simply, information superiority. Failure to do so is dangerous folly and invites defeat in ODS-like magnitude. "Adapt or die" is Darwinian truth in any survival situation. This truth resonates on battlefields through history and applies fully as the information age arrives.

The author of Joint Vision 2010 intrinsically understands this, and for this reason the vision's epistemology begins with information superiority. Information superiority is correctly the enabling architecture for JV 2010's principal concepts. Without the foundation stone of information superiority, dominant maneuver, precision engagement, full-dimension protection and focused logistics are not attainable.

JV 2010 seeks the extra-sensory advantage of the sighted boxer over a blind opponent. Cursing not the darkness, JV 2010 relies on the candle of information superiority to reveal the true prize. That prize, flowing from information superiority, is addressed in our next section.

The Prize

The prize accruing from possession of information superiority is the ability to influence the enemy commander's decision loop while maintaining the sanctity of our own. When achieved, the enemy commander sees only what we wish him to see, and further cannot distinguish between what is real and unreal. His decisions therefore are adversely impacted and intrinsically faulty. Bad decisions flow from bad data and/or incomplete information. The enemy commander unconsciously adopts a false situational awareness. This false awareness deserts him faithlessly when friendly forces impose reality at a time and place of our choosing. At that juncture, the game is lost.

When the prize of information superiority is achieved, the enemy commander is transformed by his own decisions into an obliging opponent. His mistakes support our plans. His degraded systems further exacerbate his inefficiency. His efforts in opposition to our will lose focus and cohesion. At a very minimum, his decision loop is slower than ours, granting us advantage.

Given the new battlespace of the information age, the impetus to embrace the changes needed to be successful on that battlespace, and the prize of information superiority, what is the key to achieving this vision? The answer is found in the next section.

The Key to Victory

The key to victory is the adoption of the strategy and target set that is Command and Control Warfare. Successful C2W is how military forces gain information superiority in the information age. Achieving this posits successful information war and information war is how wars will be won in the future.

Achieving information superiority will be a mandatory precursor to victory in the information age. As margins of error will consistently continue to shrink opposite the growth of technological capabilities, the danger of 'second-place' situational awareness and decision loops is precipitous. Operation Desert Storm revealed just how steep that precipice can be. Saddam Hussein--considered an industrial age power--faced only the embryonic avatar of a truly information age force and was dramatically routed.

Joint Vision 2010 is the road map to that information age force. To realize JV 2010, a concurrent embrace of C2W must also occur. This embrace is needed to give JV 2010 an organizing focus and strategy to illuminate its trek into the future. To be effective at the operational level of warfare, C2W must encompass more than its strategic dimension, a dimension that has dominated

most of the discussion to date. Several specific recommendations along this line follow below.

First, C2W must be seen as a discrete operational strategy, one that is superior to the sum of its parts. Appreciation of individual pillars and a haphazard approach to their combination (e.g., "deception by default") will not meet the standards of the new battlespace. C2W guidance spread out over four annexes and various appendixes, as was the case in CENTCOM's ODS operations order, does not fully provide the full potential of C2W pillars welded into a decisive whole. C2W must be an up-front, integrated strategy that flows smoothly from Commander's intent through execution. Moral and physical expressions of C2W must be employed in harmony. In this strategy, all the pillars must be fully integrated in order to achieve synergy.

Second, to achieve this end, an adaptation of how we plan operations is recommended. C2W must be viewed as a distinct battlefield function, much as maneuver, shaping, support, and force protection are viewed today. Further, C2W must be seen as co-equal to these functions and completely integrated in the future planning process. This entails establishing a proponent for C2W in each planning cell, responsible for integrating C2W concepts and target sets throughout the envisioned actions of the force.

Currently, C2W considerations are more often than not a subset of 'shaping', although its interplay with force protection, support, and maneuver are readily apparent. Any

subordination of C2W to other functional concepts fundamentally misses its importance in the information age. The nature of the information age battlespace demands--at a very minimum--the elevation of C2W as a functional proponent on par with the existing proponents. Further, given the baseline requirement to gain information superiority--and the dramatic results when it is not achieved--C2W arguably is the lead concept. This step is also consistent with JV 2010's view of information superiority as the key enabling concept.

Absent C2W, shaping reverts more to traditional roles, oriented on the enemy's means, position in the battlespace, logistics, and other physical expression of his power. Shaping will serve C2W (and the other proponent concepts), analogous to the way C2W physical destruction serves the other pillars of C2W. Integrating and combining still occur in the name of generating synergy.

Last, C2W must continue its movement into the realm of the operational art. It can not remain solely at the strategic level where its 'science fiction' reputation causes many to miss its cogency and powerful effect for the information age. C2W--as a warfighting approach--is central to successful warfighting in the information age and is thus of practical interest to the operational warfighter. This paper (as an open goal) hopes to facilitate the understanding and acceptance of C2W by warfighters.

Miles to Go Before I Sleep

Just as a raging torrent will cut new and unexpected channels for the riverbed, so does the application of C2W to the operational art raise more questions than answers. Unanswered issues yet to be explored include how C2W will apply in the likely Military Operations Other Than War (MOOTW) challenges of the future. If the center of gravity in MOOTW is the civil populace, then C2W is a superb vehicle to "win hearts and minds." Central to this observation is determining what is the military's proper role in C2W aimed at a civil populace. Does the military lead or follow civilian agencies such as the Department of State? What of international organizations and non-governmental organizations such as the Red Cross? Can war be 'conducted' by civil agencies? What are the legal ramifications of the non-consensual co-opting of the media to serve C2W? Where does propaganda, military public affairs, and deterrence based upon the moral aspects of C2W separate? Do they ever?

Related to the above and yet unanswered are the links between C2W and recent ideas on the merging levels of war and the concurrent expansion of the battlefield.⁹⁷ Effective C2W at the operational level likely will begin in peacetime. Does waging "information operations"--the doctrinal expression for C2W in peacetime⁹⁸--blur the distinction between peace and war? What

⁹⁷ See Douglas A. MacGregor, "Future Battle: The Merging Levels of War," *Parameters*, Vol. 22, No. 4 (Winter 1992-93), 33-47.

⁹⁸ Department of Defense Directive 3600.1 "Information Operations," Dec 1996.

can we make of merged levels, expanded battlefields, and no clear distinction of peace and war. What happens to our basic understanding of war? Is the targeting of an adversary for "peacetime C2W" an act of war? What then of the distinction between combatant and noncombatant?

Organizations change as the wave crest of military revolutions crash upon them. The introduction of firearms caused the transition from mass formations to those of line and column. So does the information age posit changes to the way we organize for war. Already highlighted are the likely flattening of hierarchies. We must ensure that our staff and force structures adapt to information war and C2W instead of the reverse. Grafting C2W onto existing staff and command structures will in time be inferior to those purpose-built to wage C2W. The point is we must fundamentally review whether we are organized correctly to wage C2W to its full potential.

These are issues for future exploration, study and analysis; they are illuminative not exhaustive. This much we know: C2W is how we will achieve information superiority in the information battlespace at the operational and tactical levels of war. It is the key to Joint Vision 2010. Embracing it takes us one step deeper into the dawning information age. It is a step we must take.

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Headquarters, U.S. Central Command, Riyadh, Saudi Arabia. *Operation Desert Storm Operations Order of 16 December 1991*,⁹⁹ specifically:
Annex B (Intelligence), specifically Appendix 7 (*Intel Support for OPSEC, PSYOPS, and Deception*).
Annex C (Operations), following appendixes:
Appendix 3 (EW OPS), *Appendix 4 (C3CM)*, and *Appendix 8 (PSYOPS)*.
Annex K (C-3 Protection),
Annex L (OPSEC).

Unpublished Interview

Brigadier General Robert F. Dees, USA, Vice Director for Operational Plans and Interoperability, J-7, Joint Staff, The Pentagon, interview by author, 31 Jan 1997.

⁹⁹ Overall, the Desert Storm Operations Order is still classified, yet portions of it never were. Included in the unclassified portions of the order is the table of contents. Classified material was for background only.