

Over Emphasis on Network Centric Warfare

EWS 2005

Subject Area Warfighting

Over Emphasis on Network Centric Warfare

EWS Contemporary Issues Paper

Submitted by Capt. J. Clagnaz

to

Major D. J. Verda, CG 6

8 February 2005

Report Documentation Page

*Form Approved
OMB No. 0704-0188*

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 08 FEB 2005	2. REPORT TYPE	3. DATES COVERED 00-00-2005 to 00-00-2005			
4. TITLE AND SUBTITLE Over Emphasis on Network Centric Warfare		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) United States Marine Corps, Command and Staff College, Marine Corps Combat Development Command, Marine Corps University, 2076 South Street, Quantico, VA, 22134-5068		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 13	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Introduction

"We are in the midst of a revolution in military affairs unlike any seen since the Napoleonic Age, when France transformed warfare with the concept of levee en masse."¹ This revolution is the transition from platform-centric warfare to network-centric warfare. A change in concept is driven by a societal shift from the industrial age to the information age. In 2001, as society transformed to meet the challenges of the information age, the Department of Defense (DoD) established the Office of Force Transformation (OFT). A top priority of the OFT is to "implement Network Centric Warfare (NCW) as the theory of war for the information age and the organizing principle for national military planning."²

Though NCW holds a promise for increasing situational awareness in some circumstances, the DoD is over relying on NCW causing a diversion of resources from units that are better suited for fighting and winning our next war. NCW is ineffective to win future wars because of security concerns, reliability issues, and inadequately trained operators and maintainers.

¹ Cebrowski, Arthur K., "Network-Centric Warfare: Its Origin and Future," *Proceedings*, January 1988, 1.

² Top Five Goals of the Director, Force Transformation
<http://www.oft.osd.mil.top_five_goals.cfm> (2 February 2005).

Network-Centric Warfare

The theory of NCW has continued to evolve and develop over time with the changing theory of computerized information. The NCW theory is flexible and dynamic as it attempts to keep pace with technology and the information age. For example, with the development of common industry protocols such as "Hypertext Markup Language (HTML), web browsers, and Java, computers with different operating systems can now communicate with each other."³ This increase in computer technology has not only enabled combat units to better communicate amongst themselves, but also has enhanced communication between different military branches. Moreover, NCW is not just technology, but also includes, emerging tactics, techniques, and procedures to fight a war. By linking sensors, communication systems, and weapon systems in an interconnected grid, NCW enhances a commander's ability to command and control his unit. However, NCW will not always render a victory in every battle.

Increased Combat Power

"With network centric warfare, the Army is shifting power away from an industrial-age focus on mass toward access and flow

³ Stein, Fred P., "Observations on the Emergence of Network Centric Warfare," Evidence Based Research, Inc., <http://www.dodccrp.org/research/ncw/stein_observations/steinncw.htm> (29 December 2004).

of information as an essential element of combat power."⁴

Proponents argue that NCW promises to increase combat power through better intelligence, surveillance, and reconnaissance (ISR). They contend that ISR leads to increased combat capability by enhancing the commander's ability to accurately target and hit enemy sites. Simply stated, when people who find targets are linked with people who shoot targets, more targets are eliminated. NCW enhances ISR by obtaining information from better intelligence collection platforms such as unmanned aerial vehicles, airplanes, and satellites. However, many proponents of NCW under-estimate the high number of resources that must be allocated to successfully implement NCW.

Network-Centric Warfare Today

Although, NCW is not going to benefit commanders in fighting an insurgency, it is being used at some level today. For example, a soldier on the ground is able to communicate in a limited fashion using voice, video, and data to both operational and strategic level assets. This communication takes place through a series of information grids.

Operations in both Afghanistan and Iraq are serving as excellent proving grounds for digital systems. In Afghanistan, the Army employed limited digital systems tied

⁴ Toomey, Christopher J., "Army Digitization: Making it Ready for Prime Time," *Parameters*, Winter 2003-2004, 2.

to special operations and intelligence forces who were able to share information with fire support assets and able to dramatically synchronize joint effects. Still, despite these successes, the networks suffered from bandwidth shortage and line-of-sight issues that will need resolution.⁵

NCW in a conventional war like Operation DESERT STORM demonstrated the "lethality gained by linking real-time information to precision guided weapons and controlling them with digital command and control."⁶

Limitations and Challenges

NCW is not "able to deal with asymmetric tactics such as irregular fighters and close-range snipers who may well operate intermingled with civilians, or even blatantly use civilians or prisoners as shields."⁷ NCW is also effective in warfare, involving an enemy who hides in caves or operates in small cells. It is well known that enemy cells may not contact their higher command for months. The absence of communication between an enemy tucked-away among the country side and the enemy's commander thwarts the ability to intercept communications and discover the enemy's location. In this situation, NCW is futile. The commander is forced to put soldiers on the ground

⁵Toomey, Christopher J., "Army Digitization: Making it Ready for Prime Time," *Parameters*, Winter 2003-2004, 51-52.

⁶Hammes, Thomas X., "The Evolution of War: The Fourth Generation," *Marine Corps Gazette*, September 1994, 2.

⁷Richardson, Doug. "Network-centric Warfare: Revolution or Passing Fad?," *Armada International*, May 2004, 70.

to find and destroy the enemy. Resources allocated to NCW will not help defeat an enemy hiding in burrows. Though NCW may be applied in today's war on terrorism, it is not what is going to win this war. Resources should be allocated towards training soldiers on the ground instead of placing an over reliance upon NCW.

Logistics and Training

NCW has a long logistics tail that extends all the way back to the air conditioned offices of defense contractors. The complex NCW systems require vast amounts of training to operate and maintain. The military has been unable to keep up with the training demands, resulting in poorly trained digital units. There are simply not enough people trained with the technology to be considered a digitally trained soldier with the capacity to operate and maintain the current NCW systems. Consequentially, there are teams of civilian contractors that operate these systems for the commanders. NCW operations manned by civilians deny the military of control and substantially increases the cost to operate and maintain the system.

Information Overload

The theoretical benefits of NCW do not always materialize in practice. For instance, during U.S. Marine Corps combat

operations against Iraq in April 2003, commanders "felt generally overwhelmed with information after attempting to operate a large number of different models of communications equipment".⁸ In this example, communication technology and NCW made command and control more difficult for the commander.

In NCW the commander is highly susceptible to information overload. In 1999, US Army experiments showed that "the significant increase in information provided to battlefield commanders could slow rather than speed decision".⁹ This is in direct contrast to the proposed benefits of NCW. The networked systems should enable a commander to make good decisions faster through the use of technology and improved tactics, techniques, and procedures.

Security and Reliability

If the logistical issues were not enough to caution the military planner from using NCW, the security concerns certainly should cause concern. NCW provides centralized access to critical information. All of the information that an enemy would need for a single successful attack is available at the touch of a button.

⁸Richardson, Doug. "Network-centric Warfare: Revolution or Passing Fad?," *Armada International*, May 2004, 64.

⁹Richardson, Doug. "Network-centric Warfare: Revolution or Passing Fad?," *Armada International*, May 2004, 64.

Security of the network is critical. However, the network and their associated sensors are highly vulnerable to attack. A well planned attack can easily bring down a network. Alternatively, an attack may be used to create deception by flooding a sensor with misinformation and altering the commander's situational awareness. Once the network is brought down or compromised, the commander loses all of the digital battlespace. In most cases, it will take the commander too long to rebuild the electronic picture of the battlefield. He will be forced back to using a map and a grease pencil to rebuild his situational awareness. Tactical networks may break down or be compromised, forcing units to maintain a paper map as a back-up in case the NSW systems encounter problems. The issue of maintaining duplicate systems further reduces the promise of NCW. The military commander must keep track of the old paper and pencil system as well as the new NCW system. The reliability of the network along with its security is paramount for the benefits NCW to be fully realized.

Interoperability

There are also problems integrating systems from the various services and allied nations. The key to NCW is interoperability. All services need to pass data, voice, and video to move toward a NCW based solution. All new systems will

have to be designed to industry standards that can be shared with various defense contractors in the development of new systems. "NCW is highly dependent not only on the interoperability of communication equipment, data, and software to enable networking of people, sensors and weapons systems, but also on the ability of those systems to handle the high work load."¹⁰

Bandwidth Constraints

One of the biggest and most expensive problems to solve with NCW is the bandwidth constraint. Modern systems require significant amounts of bandwidth to communicate in a secure fashion. The bandwidth must be available on demand and from a variety of available sources. To fully realize NCW, the entire force must be networked. This requires a robust Global Information Grid (GIG). "The ability of the GIG to establish global connectivity with sufficient bandwidth to reach this critical mass is dependent upon having adequate access to radio frequency spectrum."¹¹

¹⁰Richardson, Doug. "Network-centric Warfare: Revolution or Passing Fad?," *Armada International*, May 2004, 70.

¹¹U.S. Department of Defense, *Report to Congress: Network Centric Warfare*, 27 July 2001, vii.

Costs of Network-Centric Warfare

There are huge costs associated with developing the hardware and software required to make NCW a reality. Satellite systems cost billions of dollars. Wireless tactical networks cost hundreds of millions of dollars. Costs of training people to use and maintain these systems are very high. Additionally, the costs do not stop with the DoD in the United States. The costs extend to our allies around the world. Today, we are not only a joint force but also a multinational force. If our allies cannot tie into our secure networks because of equipment or training issues, the benefit of the system is reduced to a pre-NCW state.

Realizing the Benefits of NCW

In a limited capacity during a conventional battle NCW can give the commander an advantage in situational awareness, targeting, and communication. This has been demonstrated in Operation DESERT STORM, and to a lesser extent in Afghanistan and Iraq. There is still a long road before the concepts of NCW will be fully embraced by all the forces.

As the Army examines the still-unresolved depth of digital battle command, it must wrestle with its appropriate level compared to traditional analog methods such as a voice-over-radio network. At what level—soldier, company, or battalion—should digital systems be the primary means of transmitting information and exercising battle command? It is not a question of pure technology, but of effectiveness

in the fight. The Army needs to work hard to resolve this issue.¹²

The Army is not the only service struggling with the concepts of NCW. The Navy and Air Force are both very interested in the theory and are actively developing technology roadmaps to fully realize the benefits of NCW.

To make NCW work, all services must develop their systems in coordination with each other to ensure interoperability across in the GIG. The GIG must be expanded to support the high demand for bandwidth. The communication systems must be scaled down to be light and mobile. The systems must ensure security, redundancy, and reliability. Additionally, the system must be easy to use and maintain. Supportability of the system must be built into the cost of the system and budgeted throughout the lifecycle of the system. All of this needs to happen at a cost that does not interfere with current operations or take away combat power from the Global War on Terror.

Conclusion

NCW theory, concepts, tactics, techniques, and procedures should continue to develop; however, the amount of emphasis placed on acquiring new NCW systems should be reasonable. NCW

¹²Toomey, Christopher J., "Army Digitization: Making it Ready for Prime Time," *Parameters*, Winter 2003-2004, 10.

holds promise for the future, but is not fully ready for implementation into combat on today's battlefield. There are significant issues relating to security, reliability, and training that need to be resolved prior to full implementation of NCW. Once these issues are resolved network-centric warfare will revolutionize how wars are won in the information age.

Bibliography

- Cebrowski, Arthur K. "Network-Centric Warfare: Its Origin and Future." *Proceedings*, January 1988, 1.
- Hammes, Thomas X. "The Evolution of War: The Fourth Generation." *Marine Corps Gazette*, September 1994, 1-12.
- Keeter, Hunter C. "Pervasive Sensing Holds the Key to Network Centric Operations." *Sea Power*, September 2004, 9-10.
- Richardson, Doug. "Network-centric Warfare: Revolution or Passing Fad?." *Armada International*, May 2004, 62-72.
- Stein, Fred P. "Observations on the Emergence of Network Centric Warfare." Evidence Based Research, Inc. <http://www.dodccrp.org/research/ncw/stein_observations/steinncw.htm> (29 December 2004).
- Toomey, Christopher J. "Army Digitization: Making it Ready for Prime Time." *Parameters*, Winter 2003-2004, 40-53.
- Top Five Goals of the Director, Force Transformation <http://www.oft.osd.mil/top_five_goals.cfm> (20 January 2005).
- U.S. Department of Defense, *Report to Congress: Network Centric Warfare*, 27 July 2001.