

IMPLEMENTING NETWORK-CENTRIC OPERATIONS IN JOINT
TASK FORCES: CHANGES IN JOINT DOCTRINE

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General Studies

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ABSTRACT

IMPLEMENTING NETWORK-CENTRIC OPERATIONS IN JOINT TASK FORCES: CHANGES IN JOINT DOCTRINE, by Lieutenant Commander David Scott Dull, 102 pages.

This thesis examines joint publications and the emerging concept of Network-Centric Operations (NCO) as a basis for identifying recommended changes to doctrine in order to implement NCO in joint task forces (JTFs).

Technology is allowing the United States military to evolve from the industrial age to the information age. The Office of the Secretary of Defense has termed this evolution “Force Transformation” and identified Network-Centric Operations as the primary concept encompassing the future capabilities of the joint force.

The Department of Defense calls for co-evolution of the doctrine, organization, and technology of NCO. The technology required to achieve NCO continues to rapidly expand, and individual military services have started procuring and implementing the technology as it becomes available. Subsequently, US military JTFs have already attempted to realize the benefits of NCO in operations such as Operation Enduring Freedom and Operation Iraqi Freedom, yet the military continues to organize JTFs according to Department of Defense planning guidance and doctrine that date to July of 2001.

The conclusions reached in this thesis are that size, structure, interdependence, and synchronization are key NCO organizational attributes dictating shifts in basic joint doctrine and JTF organizational architecture.

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ACRONYMS

AAR	After Action Report
ACO	Airspace Control Order
ASD(NII)	Assistant Secretary of Defense for Networks and Information Integration
ATO	Air Tasking Order
AWACS	Airborne Warning and Control System
C2	Command and Control
C4	Command, Control, Communications, and Computer Systems
C4ISR	Command, Control, Communications, Computer Systems, Intelligence, Surveillance, and Reconnaissance
CAS	Close Air Support
CBRNE	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives
CCRP	C4ISR Cooperative Research Program
CDR	Commander
CFLCC	Combined Forces Land Component Commander
CJCS	Chairman of the Joint Chiefs of Staff
CJTF	Commander, Joint Task Force
CIO	Chief Information Officer
COCOM	Combatant Command
COI	Community of Interest
CONOPS	Concept of Operations
COP	Common Operation Picture
CUL	Common-User Logistics
CWC	Composite Warfare Commander

DIRLAUTH	Direct Liaison Authorized
DOTMLPF	Doctrine, Organization, Training, Material, Leadership Development, Personnel, and Facilities
DOD	Department of Defense
EBO	Effects Based Operations
FBCB2	Force XXI Battle Command Brigade and Below
FCS	Future Combat System
GIG	Global Information Grid
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
JTCB	Joint Targeting Coordination Board
JTF	Joint Task Force
LCDR	Lieutenant Commander
LTG	Lieutenant General
JP	Joint Publication
MOOTW	Military Operation Other Than War
NCE	Network-Centric Environment
NCO	Network-Centric Operations
NCW	Network-Centric Warfare
NPS	Naval Postgraduate School
NWP	Naval Warfare Publication
OEF	Operation Enduring Freedom
OFT	Office of Force Transformation
OIF	Operation Iraqi Freedom
OODA	Observation, Orientation, Decision, Action

OPCON	Operation Control
OSD	Office of the Secretary of Defense
RMA	Revolution in Military Affairs
SAM	Surface-to-Air Missile
SIPRNET	Secret Internet Protocol Router Network
TACON	Tactical Control
UAV	Unmanned Aerial Vehicle
UJTL	Universal Joint Task List
VADM	Vice Admiral

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CHAPTER 1

INTRODUCTION

In spite of a ponderous acquisition process, technology insertion is ahead of and disconnected from joint and service doctrine and organizational development. The problem is cultural and systemic. A process for the co-evolution of technology, organization, and doctrine is required. (1998, 35)

Vice Admiral Arthur K. Cebrowski, *Proceedings*

Technology is allowing the United States military to evolve from the industrial age to the information age. The Office of the Secretary of Defense (OSD) has termed this evolution “Force Transformation” and identified “Network-Centric Operations” (NCO) as the primary concept encompassing the future capabilities of the joint force (Alberts and Garstka 2004, 1). As the name implies, NCO focuses on networking forces, not individual capabilities of the forces. At its core, the concept proposes how a force should interrelate, organize, and implement information age technology in a new way of accomplishing missions (Braunlinger 2005, 1).

The precursor to NCO is Network-Centric Warfare (NCW), the original concept spurring transformation and now considered a subset in the broader context of Network-Centric Operations (Alberts and Garstka 2004, 1). A 2001 Department of Defense (DoD) report to Congress on the development and implementation of Network-Centric Warfare determined the tenets of NCW are:

1. A robustly networked force improves information sharing
2. Information sharing enhances the quality of information and shared situational awareness

3. Shared situational awareness enables collaboration and self-synchronization, and enhances sustainability and speed of command

4. These, in turn, dramatically increase mission effectiveness (US DoD 2001, i)

The DoD's Joint Functional Concept of the Network-Centric Environment calls for co-evolution of the doctrine, organization, and technology of NCO. The technology required to achieve NCO continues to rapidly expand, and individual military services have started procuring and implementing the technology as it becomes available. Subsequently, US military joint task forces (JTFs) have already attempted to realize the benefits of NCO in operations such as Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), yet the military continues to organize JTFs according to DoD planning guidance and doctrine that date to July of 2001 and do not address NCO.

Research Questions

This study examines the primary research question: How does the US military need to alter the current doctrinal organizational architecture of a joint task force to implement Network-Centric Operations?

This study also investigates four secondary questions: (1) Where does current doctrine converge and diverge from organizing JTFs to implement NCO? (2) What is the theory of Network-Centric Warfare (NCW) and Network-Centric Operations (NCO)? (3) What are the capabilities and associated attributes a joint task force must exhibit to conduct Network-Centric Operations? (4) What is the current organizational architecture of a doctrinal Joint Task Force?

Assumptions

A primary assumption of this research is that the US military has jointly defined the capabilities NCO provides and is jointly pursuing them. Additionally, joint network-centric systems will be interoperable and bridge all the technological gaps to implementing NCO.

Key Terms

Direct Liaison Authorized (DIRLAUTH). That authority granted by a commander (any level) to a subordinate to directly consult or coordinate an action with a command or agency within or outside of the granting command. Direct liaison authorized is more applicable to planning than operations and always carries with it the requirement of keeping the commander granting direct liaison authorized informed. Direct liaison authorized is a coordination relationship, not an authority through which command may be exercised (JP 0-2 2001, GL-7).

Joint Task Force (JTF). A JTF is a joint force that is constituted and so designated by the Secretary of Defense, a combatant commander, a subordinate unified command commander, or an existing JTF commander. A JTF may be established on a geographical area or functional basis. JTF operations normally are operational in nature, conducted to achieve operational-level objectives. Commanders of JTFs exercise OPCON over assigned forces and normally exercise OPCON over attached forces (JP 3-0 2005, II-13).

Net-Centric Environment (NCE). A framework for full human and technical connectivity and interoperability that allows all DoD users and mission partners to share the information they need, when they need it, in a form they can understand and act on

with confidence, and protects information from those who should not have it (*Net-Centric Environment Joint Functional Concept Version 1.0* 2005, 1).

Net-Centric Operations (NCO). The exploitation of the human and technical networking of all elements of an appropriately trained joint force by fully integrating collective capabilities, awareness, knowledge, experience, and superior decisionmaking to achieve a high level of agility and effectiveness in dispersed, decentralized, dynamic, and uncertain environments (*Net-Centric Environment Joint Functional Concept Version 1.0* 2005, 1).

Operational Control (OPCON). Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control may be delegated and is the authority to perform those functions involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions (JP 3-0 2005, GL-24).

Revolution in Military Affairs (RMA). A complex mix of tactical, organizational, doctrinal, and technological innovations in order to implement a new conceptual approach to warfare or a specialized sub-branch of warfare (Knox and Murray 2001, 12).

Tactical Control (TACON). Command authority over assigned or attached forces or commands or military capability made available for tasking that is limited to the detailed direction and control of movements or maneuvers within the operational area necessary to accomplish assigned missions or tasks. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercise at any level at or below the level of combatant command (JP 3-0 2005, GL-31).

Transformation. A process that shapes the changing nature of military competition and cooperation through new combinations of concepts, capabilities, people and organizations that exploit the nation's advantages and protect against asymmetric vulnerabilities in order to sustain strategic position, which helps underpin peace and stability in the world (US Office of Force Transformation 2003, 8).

Scope and Delimitations

To constrain the scope of the topic and questions, this study only considers the Joint Task Force with regards to US forces and their role in major combat operations. As such, the study often uses the term NCW interchangeably with NCO because the focus is on the warfare aspect of the overall concept. Additionally, the study does not include interagency or non-governmental organizations.

While units subordinate to the JTF function at the tactical level of war, fighting in specific battles and engagements, JTFs function at the operational level of war. JTFs translate theater and national security strategy into military operations and campaigns, commanding and coordinating tactical unit actions across the spectrum of warfare. By focusing on JTF organization, this study primarily relates to the operational level of war.

Background and Significance of Study

The industrial age has evolved into the information age, and the information age's attendant information technology (IT) has produced one of technology's greatest contributions, the Internet and the ability to network together computers across the world. Known as "network-centric computing" (Cebrowski and Garstka 1998, 30), this networking of computers, whether personal home computers, servers, mainframe, or even supercomputers, has led to many applications and effects throughout the business world and society as a whole. The list of widespread capabilities abounds, including E-mail, instant messaging and chat-rooms, online banking and commerce, peer-to-peer file sharing, and even personal websites with digitally captured family photos and videos. "Information 'content' now can be created, distributed, and easily exploited across the extremely heterogeneous global computing environment" (Cebrowski and Garstka 1998, 30). This global network has connected individuals and groups across the world in ways previously impossible, providing wide-ranging, real time information sharing.

The information age is subsequently spawning a revolution in military affairs (RMA), and with it a new concept of warfare, Network-Centric Warfare (NCW). In short, "NCW is the military expression of the information age" (US Office of Force Transformation 2003, 13). Retired Vice Admiral Arthur Cebrowski was the first to explore NCW in his seminal January 1998 *Proceedings* article "Network-Centric Warfare: Its Origins and Future," an article which has led to a widespread recognition of Vice Admiral Cebrowski as the father of NCW. Offering the inarguably dominant retailer Wal-Mart as an example, Vice Admiral Cebrowski identifies NCW's "antecedent in the dynamics of growth and competition that have emerged in the modern economy"

(Cebrowski and Garstka 1998, 29). As Wal-Mart outgrew its ability to cost-effectively coordinate supply and demand from the top, it shifted to a network-centric approach. It started tracking merchandise with point of sale sensors tied into a transaction grid that connected to all stores. Ultimately, Wal-Mart's complex operational architecture translated real-time information into a competitive advantage (Cebrowski and Garstka 1998, 30). Going on to set the stage for parallel emerging dynamics in warfare, VADM Cebrowski's innovative claim that "Network-centric warfare enables a shift from attrition-style warfare to a much faster and more effective style characterized by the new concepts of speed of command and self-synchronization" (Cebrowski and Garstka 1998, 32) became a catalyst for the United States military's pursuit of NCW.

NCW's emergence from business practices raises questions about its viability as a warfighting concept, as detailed in chapter 2. Wal-Mart and other companies may refer to their competition as enemies, but businesses are only trying to out-perform competitors, not destroy them. Likewise, VADM Cebrowski's article does not address the clashing of forces, but rather the ability to mass effects with increased combat power. Critics claim NCW disregards many uncertainties of warfare like the fog of war and friction and does not give commanders the framework for considering operational art (Vego 2003, 52). The initial purveyor of NCW paints a compelling picture of employing networked forces, but not something substantial the military can spend taxpayers' dollars against.

The events of 11 September 2001 hastened implementation of Secretary of Defense Donald H. Rumsfeld's vision of ongoing military transformation, and on 29 October 2001, Secretary Rumsfeld established the Office of Force Transformation, headed by VADM Cebrowski. Not surprisingly, NCO now forms the backdrop for much

of the technological transformation occurring throughout the US DoD. Consequently, the government and the military have sought to formalize the concept of NCO, to define its capabilities and attributes so as to pursue it. Official documents offer various particulars of NCO as further described in chapter 2, but most subscribe to the four tenets presented in the introduction.

The Air Force considers the related principles of parallel warfare and effects-based operations (EBO) as its “keys to . . . applying the right force to the right place at the right time” (US Department of the Air Force 2004, 6). To achieve parallel warfare and EBO, the Air Force plans to network every platform as a sensor, regardless of mission, and share data to all. The network is known as the Command and Control (C2) Constellation, designed to bring the Joint Force Commander real-time, superior battlespace situational awareness for air and space operations (US Office of Force Transformation, 2005, 61).

While the United States Army works to completely reorganize its units into a modular force, it plans to globally connect them through LandWarNet. LandWarNet will connect a family of systems to “enable effective situational awareness, planning, synchronization and virtual rehearsals of full-spectrum operations throughout the battlespace” (US Department of the Army 2005b, 4). Key systems for implementing the Army’s modular Brigade Combat Teams include Blue Force Tracker, Force XXI Battle Command Brigade and Below (FBCB2), and Future Combat System (FCS).

Recognizing the requirements to fight and support the battle both on land and in the air, the combined Navy and Marine Corps team plans to capitalize on their asymmetric warfare advantage--command of the sea. To ensure continued dominance of

the sea, the Chief of Naval Operations designated FORCEnet as the naval service's NCO operational construct to integrate platforms, sensors, tactical data links, command and control, and weapons into "a networked, distributed combat force, scalable across the spectrum of conflict from seabed to space and sea to land" (Chief of Naval Operations' Strategic Study Group - XXI 2002). Recognizing the overall impact of NCO, the Chief of Naval Operations and the Commandant of the Marine Corps have jointly determined FORCEnet will act as foundational pillar to transform both naval services (US Department of the Navy 2005, i).

While the terms of NCO use differ between the services, it is clear the services corporately envision information sharing at its broadest application, leading ultimately to increased mission effectiveness. They all indicate a plan to network sensor platforms, weapons platforms, and decision-makers, as well as a host of other information systems. The overall defense department strategy is to integrate service NCO components into a Global Information Grid (GIG) to provide joint collaborative planning and execution, ultimately connected to other agencies and coalition partners in combined and interagency environments. The Chairman of the Joint Chiefs of Staff's Joint Command, Control, Communications, and Computer Systems (C4) Campaign Plan views every entity in the battlespace as a potential node. To leverage those nodes and ultimately maximize combat effectiveness, the Assistant Secretary of Defense for Networks and Information Integration (ASD(NII))/ Department of Defense Chief Information Officer (CIO) has established information superiority goals with three key aspects. First, make information available on a network everyone trusts and depends on. Second, on the network, incorporate real time and dynamic information sources to overcome the enemy.

Third, the network will enable the force to exploit enemy vulnerabilities and deny comparable capabilities (US Joint Chiefs of Staff 2004b, 7).

Transformation to a force networked in the GIG will not happen through a suddenly large jump in technology, but rather relies on evolving internet protocols, new satellite communications systems, and other gradually developing subsystems. The DoD is already taking advantage of continual advances in information technology to implement network-centric capabilities across the force. Services introduced network-centric capabilities to forces participating in OEF, and continued to capitalize on new capabilities during OIF. Furthermore, leaders are already recognizing benefits, and the US Joint Forces Command is working to develop measurable feedback through after action reports (AAR) and related case studies.

Ultimately, the shift to NCO will impact the military across the domains of doctrine, organization, training, material, leadership development, personnel, and facilities (DOTMLPF) (US Joint Chiefs of Staff 2005a, 31). The challenge lies in that:

Failure to coevolve technological, organizational, and doctrinal innovations may lead to inefficiencies in the deployment and utilization of net-centric systems and concepts. Such failure may arise from, for example, unresponsive acquisition processes, organizational and cultural inertia, insufficient scientific advancement, or overly optimistic assumptions about technical or organizational capabilities. (US Joint Chiefs of Staff 2005a, 36)

Technology appears to be outpacing organizational and doctrinal innovation, with commanders continuing to organize joint forces in doctrinal structures that have existed since before the first Gulf War. DoD has an expectation that for the Joint Force, “organizational structures will transform as information and understanding are shared. New organizations will emerge, existing organizational structures will change (e.g., flatten), and some organizational structures will disappear” (US Joint Chiefs of Staff

2005a, 31). With a view towards reconciling the evolving technology of NCO and the expected changes in a JTF, this study attempts to provide suggestions on how to implement NCO capabilities and organize the JTF to maximize the benefits.

CHAPTER 2

LITERATURE REVIEW

Introduction

The purpose of this chapter is to examine writing and research documents on the topics of Network-Centric Operations (NCO) and Joint Task Forces (JTFs), including a review of research on applicable organizational models. The result will be to identify the relevant concepts and terms underlying each and provide a basis for relating NCO and JTFs. Additionally, this chapter will introduce government publications and doctrine that represent official positions and guidance on NCO and JTFs.

Network-Centric Warfare (NCW)

Assessing the genesis and foundation of the concept of NCW is critical to the application of NCO to military organizations. Works in the areas of the Revolution in Military Affairs and the Department of Defense (DoD) force transformation outline the technological evolution underlying the shift to NCO. Retired Admiral William Owens' book, *Lifting the Fog of War*, discusses the progression of technology and questions the required scope of the revolution, serving as a critical framework for the overall research question. After VADM Cebrowski wrote his groundbreaking article laying out NCW in the January 1998 issue of *Proceedings*, other military, government, and defense industry authors generated an overabundance of books and articles on NCW, providing ample background information. Numerous authors critique the initial vision of NCW and in doing so contribute to defining the concept.

As both academics and military leaders have written and spoken on the topic, they have identified many tensions that exist, both praising NCW's potential and cautioning against its pitfalls. Two key works by prominent authors who have worked with VADM Cebrowski in the Office of Force Transformation help define the bounds of NCW, leading to definite capabilities.

Network-Centric Warfare's Seven Deadly Sins

Though most noted as author of the *New York Times*-bestselling book, *The Pentagon's New Map: War and Peace in the Twenty-First Century*, Dr. Thomas P.M. Barnett has written on many topics regarding national security affairs in his role as a strategic planner. From 1998 to 2004, Dr. Barnett was a senior strategic researcher and professor in the US Naval War College's Warfare Analysis and Research Department, a period during which he also temporarily served as the Assistant for Strategic Futures in the Office of Force Transformation from November 2001 to June 2003. He currently serves as Senior Managing Director of The New Rules Sets Project LLC, a consulting partnership that formed out of a project Dr. Barnett headed while at the Naval War College.

Dr. Barnett published his article, "The Seven Deadly Sins of Network-Centric Warfare," in *Proceedings* in January 1999, one year after the seminal article by VADM Cebrowski. Barnett's article serves as the critique of someone who recognizes NCW's inevitability and does not want to bury NCW, but just ensure its relevancy. He expressly cites VADM Cebrowski's article and states that he is not writing to prove VADM Cebrowski and coauthor John Garstka wrong, but as "a devil's advocate take on what I

see as network-centric warfare's seven deadly sins. Note that I don't say 'mortal sins.' As with any transgression, penance can be made" (Barnett 1999, 36).

Lust: Network-Centric Warfare desires an opponent worthy of its technological prowess.

Barnett doubts the US military will ever fight an enemy to match it in terms of information technology, assuming matched forces are a pre-requisite for the effective employment of NCW. He also questions interoperability with allies as a result of pursuing information technology that could require a complete reinvestment in force structure (Barnett 1999, 36).

Sloth: Network-Centric Warfare slows US military adaptation to military operations other than war (MOOTW).

Barnett's article offers MOOTW as the primary focus of US forces, not accounting for Operations Enduring Freedom and Iraqi Freedom, but certainly encompassing a majority of the conflict in the Global War on Terror. The point questions the focus of the network and what the military goal is. Summarizing this point, Barnett writes:

Correctly focused, network-centric warfare would allow the U.S. military to come into any crisis situation and establish an information umbrella to boost the transparency of everyone's actions. Incorrectly focused, it might hamstring us along the lines of the Vietnam War. In sum, NCW's quest for information dominance is self-limiting in an era that will see the U.S. military far less involved in network wars than in mucking around where the network is not. (Barnett 1999, 37)

Avarice: Network-Centric Warfare favors solutions that are numerous and cheap; the US military prefers solutions that are fewer and costly.

As the US military consistently sacrifices numbers to technology, the implementation of NCW is unlikely to happen in the widespread manner required to succeed according to Dr. Barnett. The networking solutions have to include economies of scale, with no node worth more than the connectivity it brings. Asymmetric threats will skew the risk analysis in deploying NCW capabilities, and loss of important nodes will be grounds for either escalation or withdrawal (Barnett 1999, 37).

Pride: Network-Centric Warfare's "lock-out" strategy relives old dreams of strategic bombing.

Barnett disputes the continued notion that massing effects against enemy centers of gravity will lead to swift and bloodless victory. Insufficient bomb damage assessment capabilities prevent accurate massing of effects, thus precluding steering an opponents actions down a particular path. The US also sees most foes with its own weaknesses, not recognizing their ability to work-around. Ultimately, NCW might prevent the military from relating adequately "to the universe of relevant data and subject-matter experts outside the usual realm of political-military thinking. We do not possess the decision-assessment tools at this point to steer an opponent via information dominance" (Barnett 1999, 38).

Anger: Network-Centric Warfare's speed of command philosophy might push the US military into shooting first and asking questions later.

Dr. Barnett posits that the unspoken assumption regarding speed of command is that faster reception and processing of data will drive the military to act rashly. Whereas proponents of Air Force Colonel John Boyd's OODA Loop (observation, orientation, decision, action) suggest NCW will allow the US military to operate inside an enemy's

decision-making cycle, Dr. Barnett sees the possibility of acting so fast that forces prompt and react to their own signals. Confused enemy reaction to NCW derived prompts might lead to quicker escalation. According to Dr. Barnett, increased data processing and distribution speed should actually afford US forces more time for analysis and consideration of appropriate actions instead of simply decreasing response time (Barnett 1999, 38).

Envy: Network-Centric Warfare covets the self-synchronization of the commercial world.

The US military continues to push for all units to have the same information as it seeks to decentralize decision-making as much as possible. At some point though, Dr. Barnett sees the increased operational flexibility of NCW dangerously “slimming down” the OODA loop. While “the implied goal of self-synchronization is that information technology will facilitate such a rapid movement of information as to obviate the time requirements of the ‘OO’ portion, allowing commanders to exploit speed of command” (Barnett 1999, 39), Dr. Barnett foresees the reality that the ever-growing ambiguity of crises actually requires more time to observe and orient. MOOTW should encourage a greater external focus for networks, especially since future scenarios might require the military to apply its information technology to carry out the “OO” portion of the loop while other agencies do the deciding and acting (Barnett 1999, 39).

Gluttony: Network-Centric Warfare’s common operation picture (COP) could cause information overload in commanders and warfighters.

NCW aims to provide all constituents at all levels the same mental information model. The wealth of information the COP seeks to integrate has the potential to

overwhelm participants with large amounts of data “masquerading as information.” A danger also exists that the COP may collapse awareness of what is tactical versus operational versus strategic, causing participants to overload with information as they try to maintain situational awareness in such an all-encompassing picture. NCW can flatten command hierarchies and allow commanders to incorporate all the other commanders’ intents besides just up their chain of command. While the drive for speed of command and self-synchronization may lead players into an over reliance on a “shared-reality” COP that is neither shared nor real, the ability for commanders to access all the information might actually stifle speed of command and self-synchronization. Protection against commanders becoming control freaks requires an understanding of “the concept of information sufficiency by level of command” (Barnett 1999, 39).

Network-Centric Warfare’s Eleven Myths

The Office of the Assistant Secretary of Defense (Networks & Information Integration)’s C4ISR Cooperative Research Program (CCRP) has conducted extensive research exploring the concepts of NCO. The CCRP’s express mission is to investigate how the DoD can take advantage of the prospects of the information age, linking together the operational and research communities. CCRP’s clearinghouse of books, articles, and monographs on NCW include the three key works *Network Centric Warfare: Developing and Leveraging Information Superiority* (1999), *Effect Based Operations: Applying Network Centric Warfare in Peace, Crisis, and War* (2002), and *Power to the Edge* (2003). *Complexity Theory and Network Centric Warfare* (2003) also discusses theory related to organizations and systems, providing research models discussed later in this chapter.

Of particular importance is the 1999 publication on NCW. One of the three authors, John J. Garstka, previously coauthored the 1998 *Proceedings* article with VADM Cebrowski and went on to become an assistant director for the Office of Force Transformation (OFT). The book expressly presents itself as a means of laying the groundwork for NCW, to “help prepare for the journey that will take us from an emerging concept to the fielding of real operational capability” (Alberts, Garstka, and Stein 1999, ix). Specifically, the book aims to delineate “the nature of the characteristics of Network Centric Warfare” (Alberts, Garstka, and Stein 1999, ix), but also recognizes that the thoughts and experiences of the concept will evolve rapidly. The key contribution of *Network Centric Warfare: Developing and Leveraging Information Superiority* is its stage setting discussion of 11 NCW myths. The “myths” attempt to answer some of the initial critics of whom Dr. Barnett is a ready example. The myths detail some of the initially circulated dangers and limitations of NCW, and provide a foundation for the broader concept of NCO.

Myth 1: The authors are experts on NCW, and their publication has all the answers regarding NCW.

The authors openly discard the fact that they, or anyone else for that matter, are experts on NCW. NCW is much “more a state of mind than a concrete reality” (Alberts, Garstka, and Stein 1999, 5), and it will be some time in the future before anyone will fully understand the potential of NCW, much less reach the potential and apply it. Translating the concept into operational capabilities will require more than just infusing the battlespace with an information infrastructure. It will require leveraging the information through new concepts of operations (CONOPS), command and control (C2)

architectures, organizational modes, doctrine, force structure, and even supporting services.

Myth 2: Network Centric Warfare is wholly about the network.

NCW is more about networking systems than the actual networks between them. NCW derives its increased combat power from effectively networking geographically or hierarchically dispersed knowledgeable entities. The networking enables information sharing and collaboration towards a shared awareness, ultimately leading to self-synchronization (Alberts, Garstka, and Stein 1999, 6-7).

Myth 3: Network-Centric Warfare will change the nature of warfare.

When considering the time-tested principles of war, only the principles of mass and maneuver need modified interpretations to reflect massed effects instead of forces. NCW does however provide the opportunity to decrease the friction among the principles, specifically the principles of offense, economy of force, surprise, and especially unity of command. The authors also contend that, despite well-founded criticism, NCW can also contribute to the principle of simplicity (Alberts, Garstka, and Stein 1999, 7).

Myth 4: Network-Centric Warfare only applies to large-scale combat operations against a peer competitor.

Rather than solely applying NCW to tactical sensor-to-shooter contexts, NCW can apply across the principles of war and thus across the mission spectrum. NCW can increase battlespace awareness, speed of command, and force responsiveness, all aspects of MOOTW. In these operations, the sensors and collection systems providing appropriate information may be the only limit to applying NCW. Even when the

information is not perfect though, it is probable that sharing an understanding of what is known and what is not known would be preferable to units operating in isolated ignorance (Alberts, Garstka, and Stein 1999, 8). In general, this myth refutes the ideas Dr. Barnett presents in his “sin of sloth.”

Myth 5: Network-Centric Warfare makes US forces more vulnerable to asymmetric attacks.

The authors do not claim “NCW will make us less vulnerable” (Alberts, Garstka, and Stein 1999, 9), because in truth, no one knows. Rather, future vulnerability with respects to NCW depends on how the concept is translated into new concepts of operation, doctrine, force structure, and other elements. The vulnerability may come more in the form of the disparate systems networked together and their individual and collective complexity. NCW should not be discarded because of perceived vulnerabilities, but rather applications should be vigorously tested and subjected to attack (Alberts, Garstka, and Stein 1999, 9).

Myth 6: Network-Centric Warfare is well on the road to development.

Leveraging information superiority through the application of NCW requires two things, first, a suitable information infrastructure, and second, co-evolution of the CONOPS, C2 architecture, doctrine, organization, and the people with the appropriate level of training and expertise. With regards to the information infrastructure, connectivity, bandwidth, mobility, and survivability all present substantial challenges. Likewise, current acquisition practices make integration and interoperability a further problem for a working infrastructure. Furthermore, because current reward for innovation is low, “our applications of NCW concepts are more likely to be linear extensions of

current concepts and practices rather than being truly innovative” (Alberts, Garstka, and Stein 1999, 10). This could lead to a vicious cycle where lack of infrastructure hampers innovators by making it hard to imagine the possibilities and experiment, and then by making the newly developed concepts seem out of reach (Alberts, Garstka, and Stein 1999, 10).

Myth 7: The business world has illuminated the path, and all the military needs to do is follow.

In truth, “network-centric concepts do not automatically translate into effective organizations” (Alberts, Garstka, and Stein 1999, 10), whether one is trying to apply concepts in the commercial sector or the military. The authors contend that, while the assertion “what is good for business is good for DoD” is a perilous oversimplification, the converse assertion that “lessons learned in the commercial sector have no application to the domain of warfare” is likewise untrue and would stifle opportunities to learn from the experiences of others if believed (Alberts, Garstka, and Stein 1999, 10-11). This myth directly relates to the “envy” Dr. Barnett perceives the military establishment has of the business world’s implementation of information technology.

Myth 8: Network-Centric Warfare will give the US power to dominate opponents.

No single concept is the answer to dominating warfare, but NCW will allow the military to most effectively and efficiently use its people and assets. Beyond sharing their information though, increased shared awareness still depends on improved collection and analysis capabilities. Likewise, superior collaboration, speed of command, and self-synchronization will not make up for relying on insufficient or inappropriate weapons for the designated task (Alberts, Garstka, and Stein 1999, 11).

Myth 9: Network-Centric Warfare will not survive beyond first contact with the actual fog, friction, and complexity of war.

Though the complexities of fog, friction, and even irrationality will always pervade war, they do not diminish the increased battlespace awareness and access to geographically disperse assets NCW brings. Though NCW cannot predict human and organizational behavior, its ubiquitous near real-time picture (where possible through observation and sensors) will reduce uncertainty in a significant manner. Furthermore, increased battlespace awareness and responsiveness will provide the opportunity for initiative on the battlefield, key aspects of the principle of offense (Alberts, Garstka, and Stein 1999, 12).

Myth 10: Network-Centric Warfare is an attempt at automating war that can only fail.

NCW does not seek to turn the battle over to “the network” or depend more on automatic tolls and decision aids. Rather, NCW seeks to generate increased combat power by exploiting information to more effectively bring warfighting assets to bear. “NCW is about developing collaborative working environments for commanders, and indeed for all our soldiers, sailors, marines, and airmen to make it easier to develop common perceptions of the situation and achieve (self-) coordinated response to situations” (Alberts, Garstka, and Stein 1999, 12-13). There may be a place for automated tools and decision aids, as well as automated processes, in the battlespace of the future, but they are not the focus (Alberts, Garstka, and Stein 1999, 12-13).

Myth 11: Network-Centric Warfare will result in the military chasing its tail rather than responding to battlespace events.

Some have offered the criticism that NCW's impact on speed of command will be to develop such a rapid pace that forces will get ahead of themselves on the battlefield, much like Dr. Barnett's concern about NCW's "anger." In other words, instead of "giving the enemy a vote" and responding to an opponent's actions and reactions, NCW will drive forces to respond to their own actions and reactions. While the authors admit this is possible, they propose "there are many circumstances and missions, where, all things being equal, speed of command will be decisive" (Alberts, Garstka, and Stein 1999, 13). NCW will give the opportunity to increase speed of command where appropriate, but not force the issue. The point is a need to understand how to leverage information into speed of command and dismiss the idea that speed (or any other principle of factor) is "either a panacea or an unmitigated good" (Alberts, Garstka, and Stein 1999, 13).

Cited by most substantial follow-on studies, the CCRP book lays out a way ahead to develop operational capabilities and realize the potential of NCW. Many of the myths continue to frame the development and the debate of the NCW concept as generalized principles. The work sets a baseline for the body of knowledge regarding NCO and greatly influences DoD's 2001 Report to Congress on NCW, one of the first government documents to state the basic tenets of NCW, as previously presented in Chapter 1:

1. A robustly networked force improves information sharing
2. Information sharing enhances the quality of information and shared situational awareness
3. Shared situational awareness enables collaboration and self-synchronization, and enhances sustainability and speed of command
4. These, in turn, dramatically increase mission effectiveness (US DoD 2001, i)

Implementing Network-Centric Warfare

The Office of Force Transformation's publication, *The Implementation of Network-Centric Warfare*, takes a step beyond the Report to Congress. Not only does it present the tenets of NCW to aid in understanding the greater power of networked forces, it also provides governing principles to guide the application of NCW. Though the Office of Force Transformation (OFT) does not claim the governing principles of NCW will replace the existing principles of war, they do give direction to information age military operations, constituting "the new rules by which a network-centric force organizes, trains, and operates" (US Office of Force Transformation 2005, 7-8). Though the principles do not detail the "how" for network-centric forces, they do expand upon the previously identified tenets of NCW and add some key provisions. The governing principles of a network-centric force are:

1. Fight first for information superiority
2. Access to information: shared awareness
3. Speed of command and decision making
4. Self-synchronization
5. Dispersed forces: noncontiguous operations
6. Demassification
7. Deep sensor reach
8. Alter initial conditions at higher rates of change
9. Compressed operations and levels of war (US Office of Force Transformation 2005, 8)

In practical application these governing principles are serving to guide development of the family of joint operations concepts by the Joint Staff's Joint Experimentation, Transformation, and Concepts Division (J-7). The Joint Functional Concept describing the network-centric environment is described later in this chapter.

A Conceptual Framework for Network Centric Operations

The *Network Centric Operations Conceptual Framework* is a joint effort between the OFT and the Office of Assistant Secretary of Defense (Networks and Information Integration), an effort headed by two of the principal theorists of NCO, Mr. John Garstka and Mr. David Alberts. The conceptual framework begins with a thorough overview of the strategic environment and imperative for transforming the military, setting globalization and the shift to the Information Age as the background. The document then identifies the OFT as the lead effort in moving the US military from an Industrial Age to an Information Age organization, with five goals to focus the transformation efforts. Reflecting the OFT's commitment to NCO as the foundation for transformation, one of the goals is to "implement Network Centric Operations (NCO) as the theory of war for the Information Age and the organizing principle for national military planning and joint concepts, capabilities, and systems" (Alberts and Garstka 2004, 12). Towards that goal, the framework represents multiple objectives of the OFT in implementing NCO:

to provide a better understanding of key NCO attributes and their interrelationships; to provide metrics to measure progress in developing transformed, network-centric forces; and to help understand and articulate how NCO capabilities can be a source of combat power. (Gonzales, Hollywood, Kingston, and Signori 2005, iii)

The rich and comprehensive NCO-related metrics provide a basis for quantitative exploration and assessment of NCO hypotheses and investment strategies for the full spectrum of doctrine, organization, training, material, leadership development, personnel, and facilities (DOTMLPF) (Alberts and Garstka 2004, 2).

The document identifies an initial set of necessary changes that must take place across four domains if transformation is to succeed. First, change must take place in the physical and information domains, which include new communications, weapons, and supporting information systems and infrastructure. At the same time, change must take place in the social and cognitive domains in which people, organizations, and their processes interact. Changes across the four domains will amount to a new rule set of new formal rules and regulations, new informal norms, new roles, and new relationships (Alberts and Garstka 2004, 13). The domain names are generalized tools to break down the complex factors impacting mission effectiveness.

As an assessment tool, the *Network Centric Operations Conceptual Framework* is significant because it fleshes out each of the four domains into attributes and associated metrics for measurement. The social domain specifically expresses the “set of interactions between and among force entities,” providing a method to evaluate organizations (Alberts and Garstka 2004, 13). Specific attributes of the social domain relevant to evaluating an organization include the organizational characteristics of size, structure, and interdependence, and the organizational behavior of synchronization (Alberts and Garstka 2004, 167-169). Chapter 4 will provide a detailed review of these attributes, as they constitute key means for evaluating current JTF organizations.

A Joint Functional Concept for the Net-Centric Environment

As previously noted, The Chairman of the Joint Chiefs of Staff (CJCS) is seeking to codify the tenets of NCO and other broad joint concepts in a family of related documents, the Joint Operations Concepts. The purpose of these four Joint Operating Concepts, seven Joint Functional Concepts, and six Joint Integrating Concepts is to “lead force development and employment primarily by providing a broad description of how the future joint force will operate” (US Joint Chiefs of Staff 2005c, vii). The Joint Functional Concepts specifically focus on describing how the future Joint Force will carry out a particular function across the full spectrum of military operations by identifying required capabilities and attributes to generate the desired effects of the future force.

The *Net-Centric Environment Joint Functional Concept* (April 2005) focuses on identifying the principles, capabilities, and attributes a joint force needs to function in a fully connected framework (US Joint Chiefs of Staff 2005a, v). The functional concept divides the capabilities and attributes up into a model comprised of two areas, knowledge and technical. The knowledge area specifically consists of the cognitive and social interaction capabilities and attributes needed to function effectively in the net-centric environment. As with the conceptual framework, the capabilities of social interaction apply to organizational structure in a Joint Task Force. While the conceptual framework provides attributes and metrics to evaluate organizations, this functional concept provides the study’s foundation for defining the capabilities required in an organization to conduct NCO. Chapter 4 will further detail the knowledge area capabilities and attributes relevant to JTFs.

The functional concept does make some specific predictions about new organizational relationships required to effectively apply joint forces in the information age. First, “Within the Joint Force, organizational structures will transform as information and understanding are shared. New organizations will emerge, existing organizational structures will change (e.g., flatten), and some organizational structures will disappear.” Additionally, “Horizontal relationships between organizations (both formal and informal) will become more important” (US Joint Chiefs of Staff 2005a, 31). This study specifically analyzes JTF organizational structure and relationships to provide some recommended changes.

Joint Task Force

Joint doctrine publications constitute the foundation of information for Joint Task Force (JTF) organization. Key publications are JP 0-2, *Unified Action Armed Forces (UNAAF)*; JP 3-0, *Joint Operations*; and JP 5-00.2, *Joint Task Headquarters*. Additional joint publications prescribing certain aspects of JTF organization include JP 3-30, *Command and Control for Joint Air Operations*, and JP 3-31, *Command and Control for Joint Land Operations*.

JP 0-2 is the basic doctrine for the use of joint forces as required by national security strategy and national military strategy. It provides the formal definition for terms such as role, mission, and function, but more importantly lays out the framework for US military chain of command and the command relationships, responsibilities, and authority at all levels down to service components. Key terms that determine organizational structure and relationships include Operational Control (OPCON), Tactical Control (TACON), supporting, and supported, and the various categories of support. JP 0-2 also

addresses the key terms of commander's intent, situational awareness, synchronization, simplicity, span of control, and unit integrity.

In addition to defining terms and concepts, JP 0-2 deals with organization of joint forces. It provides guidance to establish a JTF "on a geographical area or functional basis when the mission has a specific limited objective and does not require overall centralized control of logistics" (JP 0-2 2001, V-10). Joint Task Forces must have forces from more than one service component (the US Navy and Marine Corps count singularly as the sea service) and can optionally organize forces under subsequent JTFs, as functional components operating in the same medium or dimension, or subordinate attachments.

JP 3-0 gives additional detail to the terms covered in JP 0-2 and also adds that a JTF may have a logistics focused mission. It goes on to clarify that a functional component can be used to employ forces operationally or coordinate selected functions.

JP 5-00.2 provides joint doctrine for forming and employing a JTF headquarters. JP 5-00.2 also gives background for the formation of semipermanent JTFs whose missions change rather than dissolve, but it does not detail how JTF organization might change based on the evolving mission. JP 5-00.2 states, "The first principle in joint force organization is that CJTFs organize forces to accomplish the mission based on their vision and concept of operations" (2005, II-1). JP 5-00.2 also states that JTF commanders may decide to centralize certain functions within the joint force, but they should avoid reduction in versatility, responsiveness, and initiative of subordinate forces (2005, II-1).

Ultimately, joint doctrine does not prescribe a specific organization for JTFs. It describes certain entities and their relationship within a JTF, but it only provides general suggestions on how to arrange the entities. While joint publications do indicate

commonly used arrangements, they do not refer to specific historic examples of past JTF organization. Joint doctrine does provide clear definitions for types of authority within the organization.

Theses Regarding JTFs and Organizational Models

Research from military and civilian sources provides a wealth of analysis and recommendations regarding JTFs and organizational models, including possible applications in NCO. The models covered will provide the means for describing JTF organization for analysis in chapter 4.

Identifying and Evaluating Organizational Structures and Measures for Analysis of Joint Task Forces

Commander Stephen Olechnowicz's 1999 thesis at the Naval Postgraduate School (NPS), "Identification and Evaluation of Organizational Structures and Measures for Analysis of Joint Task Forces," seeks to develop models useful for determining JTF organizational performance by examining possible organizational architectures and their measures. He describes an organizational architecture as "the superposition of several structures," and determines five pertinent structures for a JTF based upon reviewing organizational theory literature and interviewing over a dozen senior joint flag officers (Olechnowicz 1999, xii). Commander Olechnowicz's chosen structures contributing to organizational architecture include:

1. Command Structure
2. Authority Structure
3. Formal Communications

4. Informal Communications

5. National Intelligence (Olechnowicz 1999, 41)

Command Structure refers to the organization's number of levels and span of control, or depth and breadth, whereas Authority Structure describes the authority and reporting flows within the organization. Formal and Informal Communications refer to the degree that each entity or node in a hierarchy can communicate with others based on guidelines set by the JTF commander and subordinates. National Intelligence describes access to high-level intelligence products, presuming the specified intelligence is only available to component commanders in the JTF organization (Olechnowicz 1999, 14-20). This structure may not be relevant in the current environment, and may be modified to reflect access to general Intelligence, Reconnaissance, and Surveillance (ISR).

When defining a model JTF for analysis, Commander Olechnowicz determines that the two most contentious design issues that must always be considered as points of possible friction are the Command Structure and Authority Structure (control). While joint publications direct organizing the joint forces based on mission, they also require the inclusion of service component commanders at a minimum. JTF commanders are also given the possibility of functional component commanders "when forces from two or more Military Departments must operate in the same domain or there is need to accomplish a distinct aspect of the assigned mission" (JP 3-0 2005, 14). Additionally, the previously mentioned concepts of OPCON and TACON generate dual allegiances within the Authority Structure (Olechnowicz 1999, 47-50). Chapter 4 will further explore these concepts and their impacts to the force.

Commander Olechnowicz also identifies five commonly accepted organizational structures from studies in the field of joint cognitive and structural basis of social and organizational behavior. The stylized organizational architecture of a Hierarchy rises as the only applicable architecture for a JTF. The Hierarchy is a multileveled architecture in which a Top-level manager (the CJTF) stands above subordinate Middle Managers (component commanders), who then direct the actions of Baseline Agents (force units) (Olechnowicz 1999, 22).

Dynamic Organizational Schema for Network-Centric Organizations

Lieutenant Commander Gregory Maguire's 2003 NPS study, "Concept of a Dynamic Organizational Schema for a Network-Centric Organization," focuses on determining interrelationships the organizational, informational, and physical architectures will have on command and control of joint forces in a net-centric environment. His primary question, "What types of organizational characteristics and design parameters does a network-centric organization require, and what capabilities must that organization possess to best fit the proposed dynamic environment of network warfare?" (Maguire 2003, 5) broadly correlates to this study's secondary questions. Most importantly, by also exploring organizational theory as a foundation for his analysis, Lieutenant Commander Maguire supplies additional elements for describing the current doctrinal organizational architecture of JTFs.

Based on Henry Mintzberg's 1979 integration of the empirical literature on organizations, *The Structuring of Organizations: A Synthesis of the Research*, Lieutenant Commander Maguire presents six parts of an organization and their six coordinating

mechanisms as the foundation for developing his dynamic organization for NCO (Maguire 2003, 12). Of the 12 total concepts, 5 correspond to organizational structures detailed by Commander Olechnowicz, specifically:

1. Strategic Apex
2. Middle Line
3. Operating Core
4. Mutual Adjustment
5. Direct Supervision

Strategic Apex, Middle Line, and Operating Core all relate to nodes in the Command Structure, roughly mirroring the Top-level Manager, Middle Managers, and Baseline Agents of the Hierarchy organizational architecture. Mutual Adjustment corresponds directly to the structure of Informal Communication, a coordination method Maguire terms “the essence of self-synchronization and adaptive behavior” (Maguire 2003, 16). Finally, Direct Supervision relates to Olechnowicz’s Authority Structure and thus the coordination realized through the direction of a hierarchical leader (Maguire 2003, 17).

Summary

Though the US military continues to implement the technology components of Network-Centric Operations, a corresponding evolution of organizational doctrine is not taking place. Therefore, the purpose of the study is to determine whether the US military can implement the concept of Network-Centric Operations using the current doctrinal organizational architecture of a joint task force. To that end, this chapter has explored the foundations of NCO and their development into official US military concepts and policy for network-centric organizations. Additionally, the chapter has reviewed the relevant

joint publications regarding JTFs and presented elements for describing their organizational architecture. Lastly, chapter 2 has introduced the sources of information for the practical evaluation of historical joint force organizations.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

The Department of Defense's (DoD) Joint Functional Concept of the Network-Centric Environment calls for co-evolution of the doctrine, organization, and technology of NCO. Though US military joint task forces (JTFs) have already attempted to realize the technological benefits of NCW, DoD planning guidance and doctrine that organize joint task forces date to July of 2001. Thus, the purpose of the study and the primary research question is: How does the US military need to alter the current doctrinal organizational architecture of a joint task force to implement Network-Centric Operations?

The research method includes three general parts for use in analysis and final conclusions. First, chapters 1 and 2 presented a broad overview and literature review of the relevant concepts regarding NCO and JTFs. To complete the analysis, chapter 4 will present two additional components. Those components include an analysis of a joint doctrine defining JTF organization and vignettes of various JTF organizations. The following sections detail each aspect of the research methodology.

Literature Review

In order to answer the primary research question, key secondary research questions were proposed: (1) Where does current doctrine converge and diverge from organizing JTFs to implement NCO? (2) What is the theory of Network-Centric Warfare (NCW) and Network-Centric Operations (NCO)? (3) What are the capabilities and

associated attributes a joint task force must exhibit to conduct Network-Centric Operations? and (4) What is the current organizational architecture of a doctrinal Joint Task Force? To answer the secondary questions, research into relevant documents was conducted.

To determine what the theory of NCO is, a broad survey was conducted of its historical antecedents, including the technological evolution into the information age and the proposed related revolution in military affairs. This led to researching the actual genesis of NCW theory in numerous military journals, technology magazines, and other Internet resources. Determining further development of the theory included a review of detailed studies and books commissioned by the DoD. Research in this area focused on sources consistently cited in business and military journals and DoD documents.

Research into the capabilities of a network-centric force concentrated on recent DoD documents that prescribe the ongoing implementation of NCO in the US military. Though recognized as still evolving, these authoritative documents lay out specific capabilities and attributes a force should possess to conduct NCO. Since the documents presented a wide array capabilities and attributes, the study attempted to specifically identify the ones applicable to organizational design and structures.

Determining a valid model to represent the organizational architecture of a JTF included a review of joint publications, past studies on related topics, and works on organization theory and design. Joint publications provided baseline definitions of the authority and relationships within JTFs and a generic JTF model. The academic studies and associated theory then identified specific structures relevant to a JTF organization.

These structures provide a means of describing the JTF model for subsequent qualitative analysis.

JTF Organizational Analysis

The study devotes the majority of chapter 4 to answering the primary research question through an analysis of JTF organization in terms of NCO attributes. Results of the previously mentioned secondary questions serve as the criteria for the analysis.

First, chapter 4 will present the social domain characteristics and attributes from the *Net-Centric Environment Joint Functional Concept* and the *Network Centric Operations Conceptual Framework* relevant to organizational architecture as determined in chapter 2. This will include a detailed description of each and its significance in evaluating network centric organizations. This section will also list the related metrics used for evaluation.

Chapter 4 will then present the general JTF organizational model prescribed in the joint publications. The study will further develop the model in terms of the four organizational structures identified in the literature review as noted above.

Analysis will come by qualitatively evaluating the structures of the JTF organizational model through the lens of the required NCO capabilities and attributes. Specifically, the study will take each NCO attribute and apply it to the structures of the JTF organization. Additionally, the analysis will seek to point out specific aspects of the current joint doctrine governing JTF organization that do or do not facilitate NCO. Historical examples from past JTFs will provide further illustration of significant points.

Summary

Though much has been written in the field of NCO, this study highlights a key aspect as the US military continues to implement NCO. While numerous case studies have evaluated the implementation of NCO capabilities in tactical level organizations, this study looked at the operational level of warfare and specifically JTF organizations. Initial research was conducted through a broad literature review, narrowing to answer specific secondary questions. The next chapter applies the answers to those secondary questions in a qualitative analysis to reach an answer to the primary research question: How does the US military need to alter the current doctrinal organizational architecture of a joint task force to implement Network-Centric Operations?

CHAPTER 4

ANALYSIS

Introduction

Network-Centric Operations (NCO) involves networking a force to share its data and information and then translating the synergy of shared information into improved combat effectiveness (US DoD 2001, i). As previously stated, the purpose of this study is to determine how the US military must change the current doctrine for organizing a joint task force (JTF) in order to implement the concept of NCO.

This chapter begins by first answering the secondary question: What are the capabilities and associated attributes a joint task force must exhibit to conduct Network-Centric Operations? After exploring the broad scope of writings that followed Vice Admiral Cebrowski's initial article on Network-Centric Warfare, the literature review identified two current, key Department of Defense (DoD) documents prescribing these capabilities and attributes, specifically, the *Network Centric Operations Conceptual Framework* and the *Net-Centric Environment Joint Functional Concept*. The capabilities and attributes are essentially subcomponents of the previously stated tenets of Network-Centric Warfare, attempting to provide the means to answer the "why" question in explaining the apparent dramatic increase in effectiveness of NCO and related technology (Alberts and Garstka 2004, 56). This section analyzes those capabilities and attributes, and expressly details the attributes related to social interactions in organizational structures that provide a means for evaluation.

The second section of the chapter will answer another secondary question: What is the optimal organizational model of a doctrinally correct Joint Task Force? Previous

studies into the nature of JTF organization identified structures for its optimal architecture and addressed how these structure interact. This section presents the doctrinal underpinnings to that optimal organization and then explains the roles of four of the key structures, which serve as the foundation to model a JTF's organizational architecture.

As the means to answer the primary question, this chapter then assesses each NCO attribute to evaluate the JTF organization. The evaluation focuses on answering the secondary question: Where does current doctrine converge and diverge from organizing JTFs to implement NCO? The evaluation also considers historical examples that demonstrate how JTF organizations have performed, including recent experiences incorporating NCO technology. A short conclusion will summarize the findings as a precursor to the more complete discussion of the results in chapter 5.

Prior to beginning the analysis, it is necessary to review the assumptions and delimitations established in chapter 1.

A primary assumption of this research is that the US military has jointly defined the capabilities NCO provides and is jointly pursuing them. Additionally, joint network-centric systems will be interoperable and bridge all the technological gaps to implementing NCO.

To constrain the scope of the topic and questions, this study only considers the Joint Task Force with regards to US forces and their role in major combat operations. As such, the study often uses the term NCW interchangeably with NCO because the focus is on the warfare aspect of the overall concept. Additionally, the study does not include interagency or non-governmental organizations.

Network-Centric Operations Capabilities and Attributes

“A *capability* is the ability to achieve an effect to a standard under specific conditions through multiple combinations of means and ways to perform a set of tasks, and an *attribute* is a measurable characteristic of a capability” (US Joint Chiefs of Staff 2005a, 21). Network-Centric capabilities center on human interactions through information and knowledge sharing as made possible through information technology. Accordingly, network-centric capabilities and attributes are separated into the Knowledge Area and Technical Area. Cognitive and social interaction required to operate successfully in a network-centric environment encompass the Knowledge Area, whereas the actual information and the physical aspects of infrastructure, systems, and connectivity comprise the Technical Area (US Joint Chiefs of Staff 2005a, 1-2). Specific capabilities and attributes of the Knowledge Area apply directly to organizations and their interactions in NCO.

Capabilities

The Knowledge Area capabilities describe human interactions between Joint Force elements, a process leading from information exchange to shared awareness, shared understanding, and ultimately collaborative decisionmaking. While seven Knowledge Area capabilities comprise individual and group capabilities, both sets are relevant to organizational structure. In relation to the primary question, the Knowledge Area capabilities are “achieved through the employment of various collaborative techniques, organizational options, and force arrangements” (US Joint Chiefs of Staff 2005a, 22).

Specific capabilities do not exist in isolation, and in fact dependencies among capabilities cross into the Technical Area. The Technical Area capabilities actually provide the means to realize the Knowledge Area capabilities. As an example, shared understanding relies on the flow of information and knowledge and the ability of the network to provide that flow. Fourteen separate capabilities comprise the Technical Area, describing basic abilities to create information, store and share the information, and provide access to the information to all individuals, across the range of military operations (US Joint Chiefs of Staff 2005a, 22).

Evaluating a JTF's organizational architecture does not depend on the technical capabilities, but rather on the JTF's ability to achieve the Knowledge Area capabilities based on its organizational structures. The seven Knowledge Area capabilities are:

1. Ability to establish appropriate organizational relationships: "The ability to set up and change formal organizational and command relationships in accordance with mission and task needs, as well as to use flexible organizational constructs that extend across multiple commands and organizations for task accomplishment" (US Joint Chiefs of Staff 2005a, 22). This expressly addresses flexibility in organizational structures such as authority relationships, as well as an "ability to work within an implied command intent environment" (US Joint Chiefs of Staff 2005a, 22).

2. Ability to collaborate: Working together to share information and data to achieve shared knowledge is one of the most important abilities in NCO. Full collaboration will require removal of doctrinal, cultural, and organizational limits (US Joint Chiefs of Staff 2005a, 23). The case study vignettes specifically identify some of the organizational limits.

3. Ability to synchronize actions: The envisioned fast pace of operations in NCO requires entities to be able to synchronize themselves, independent from the direction of superiors. Comparable to the concept of self-synchronization, this ability enables the flexible adaptation of actions to capitalize on emerging opportunities and minimize the potential impacts of emerging threats (US Joint Chiefs of Staff 2005a, 23).

4. Ability to share situational awareness: Beyond data and information, individuals will need to share awareness and see how others perceive situations.

5. Ability to share situational understanding: While situational awareness details who, what, and where, “situational understanding is the ‘what does it mean and what can I do about it’ aspect” (US Joint Chiefs of Staff 2005a, 23) of the battlespace.

6. Ability to conduct collaborative decisionmaking and planning: The increased pace of operations and the associated planning requires commanders to be conscious of other units’ evolving tasks and missions, as well as their capacity to carry out those tasks and missions (US Joint Chiefs of Staff 2005a, 23).

7. Ability to achieve constructive interdependence: Joint Operations create options for blending together capabilities from multiple services to produce new capabilities. Constructive interdependence broadens these options by “employing the network (both human and technical) to allow a virtually limitless combination of latent Service and component capabilities in ways that create capabilities not previously achievable” (US Joint Chiefs of Staff 2005a, 23).

All but two of the listed Knowledge Area capabilities relate directly to how a JTF organizes itself. Shared situational awareness and understanding primarily describe cognitive capabilities of connected individuals in JTFs. The other capabilities require an

organizational architecture that allows the force to actually make use of the technologically enabled abilities. At a minimum, the Knowledge Area capabilities require an organizational architecture that provides for flexible reorganization and allows communication and partnership across all entities in the organization. The following section describes attributes that provide a means for evaluating the capabilities.

Attributes

After DoD's Report to Congress on NCW and the publication of *Network Centric Warfare: Developing and Leveraging Information Superiority*, only anecdotal evidence existed in support of the tenets of NCW. As such, leaders in the Office of Force Transformation (OFT) and the Office of the Assistant Secretary of Defense for Networks and Information Integration specifically wrote the *Network Centric Operations Conceptual Framework* as a means to assess the NCW tenets across developing technologies and practices. Part of the process involved expanding the original tenets into the previously described Knowledge and Technical Area capabilities (Alberts and Garstka 2004, 19). Systematic efforts have ensued to validate the capabilities of NCO, primarily in the form of case studies.

The conceptual framework expresses the NCO capabilities in terms of attributes. It divides the Knowledge Areas into the Cognitive and Social Domains, with the later defined as the "set of interactions between and among force entities" (Alberts and Garstka 2004, 13). Thus, in the Social Domain, one can measure the degree to which forces are implementing network-centric processes through the Quality of Interactions (Alberts and Garstka 2004, 125). The organizational characteristics and behaviors of size, structure, interdependence, and synchronization are all attributes that influence the

overall Quality of Interactions in the force (Alberts and Garstka 2004, 27). Other attributes exist that determine the Quality of Interactions in the Social Domain, but they represent individual characteristics and behaviors.

The attributes measure organizational characteristics and behaviors in terms of quantity (how much, how long, etc) and quality (how complete, how appropriate, how correct, etc). The *Network Centric Operations Conceptual Framework* also provides associated metrics for each attribute that attempt to identify in detail what data is needed to measure the attribute (Alberts and Garstka 2004, 59). Because the overall analysis focused on a qualitative analysis, no attempt was made to quantify any of the attributes. Specific details of the selected attributes used for assessing NCO capabilities include:

1. Size: This is simply the number of members. In the case of a JTF, no distinction is made between combat and supporting forces. Additionally, no distinction is made between those forces networked and not networked.

2. Structure: The conceptual framework defines the single attribute of structure through five different facets: distribution of peer and authority relationships, nature of authority relationships, nature of functional differentiation, connectedness within and across layers, and directedness of connections. These facets almost mirror the organizational structures identified in the review of organization theory, but as a single attribute, they do not provide a broad enough measure for evaluation of JTFs. For instance, the metric associated with measuring structure uses a scale of 1 to 5 that reflects a continuum between a hierarchical organization and a flattened organization, not actually taking into account the nature of the authority relationships or the functional

differentiation (Alberts and Garstka 2004, 168). The defined metric only actually measures the facet of distribution of peer and authority relationships.

3. Interdependence: This attribute refers to the extent to which members depend on one another for resources. In the case of a JTF, the term “resources” is not restricted to logistical resources, but also includes forces that produce combat power or combat support. The *Net-Centric Environment Joint Functional Concept* provides further clarification by noting that interdependence relies on a high degree of mutual trust, “where diverse members make unique contributions toward common objectives and may rely on each other for certain essential capabilities rather than duplicating them organically” (US Joint Chiefs of Staff 2005a, 17).

4. Synchronization: The *Network Centric Operations Conceptual Framework* defines synchronization as “purposeful arrangement in time and space” (Alberts and Garstka 2004, 90). This attribute is subjective and hard to measure. The conceptual framework provides a scale of measurement for synchronization based on the “extent to which organization is conflicted, deconflicted, or synergistic” (Alberts and Garstka 2004, 133). The final section provides more discussion of this attribute.

Additional Quality of Interaction attributes the analysis did not consider for the study include risk propensity, cooperation, and efficiency. Risk propensity attempts to measure the risk aversion of organizational cultures, and while this may be an aspect of JTF organizations, acceptable risk is not constant across the force and changes over the course of operations. The attribute of cooperation measures the extent that individuals in an organization are willing and able to work together. Cooperation also relates to an overall organizational culture, and while the organizational architecture may affect

cooperation, this attribute is hard to distinguish from barriers that may exist due to the outside influences of inter-service rivalry. Efficiency measures how much entities make use of one another's resources and thus minimize costs and maximize benefits. This attribute would be hard to apply to a JTF because each component of the organization has unique requirements and resources that are not distributed uniformly across the force.

In summary, the attributes that determine the overall Quality of Interactions measure how individuals come together in organizations to share information and awareness and make collaborative decisions with a common goal. Quality of Interactions represents the "crucial intermediate step between network-centric technologies and outcomes," and the associated attributes provide the means to measure the degree network-centric processes are executed (Alberts and Garstka 2004, 134). Thus, the analysis used these selected attributes as the standard to determine how JTF organizational architecture affects the execution of NCO.

Joint Task Force Organizational Architecture

As indicated in the literature review, joint doctrine does not prescribe a specific JTF organization. Rather, it generally describes entities, such as service or functional components, which might be in a JTF and possible ways to arrange them. Joint doctrine also defines command relationships, the associated authority, and ways the various units will interact based on the operational task. Figure 1 provides an example of possible components in a joint force, and figure 2 shows options for arranging the components.

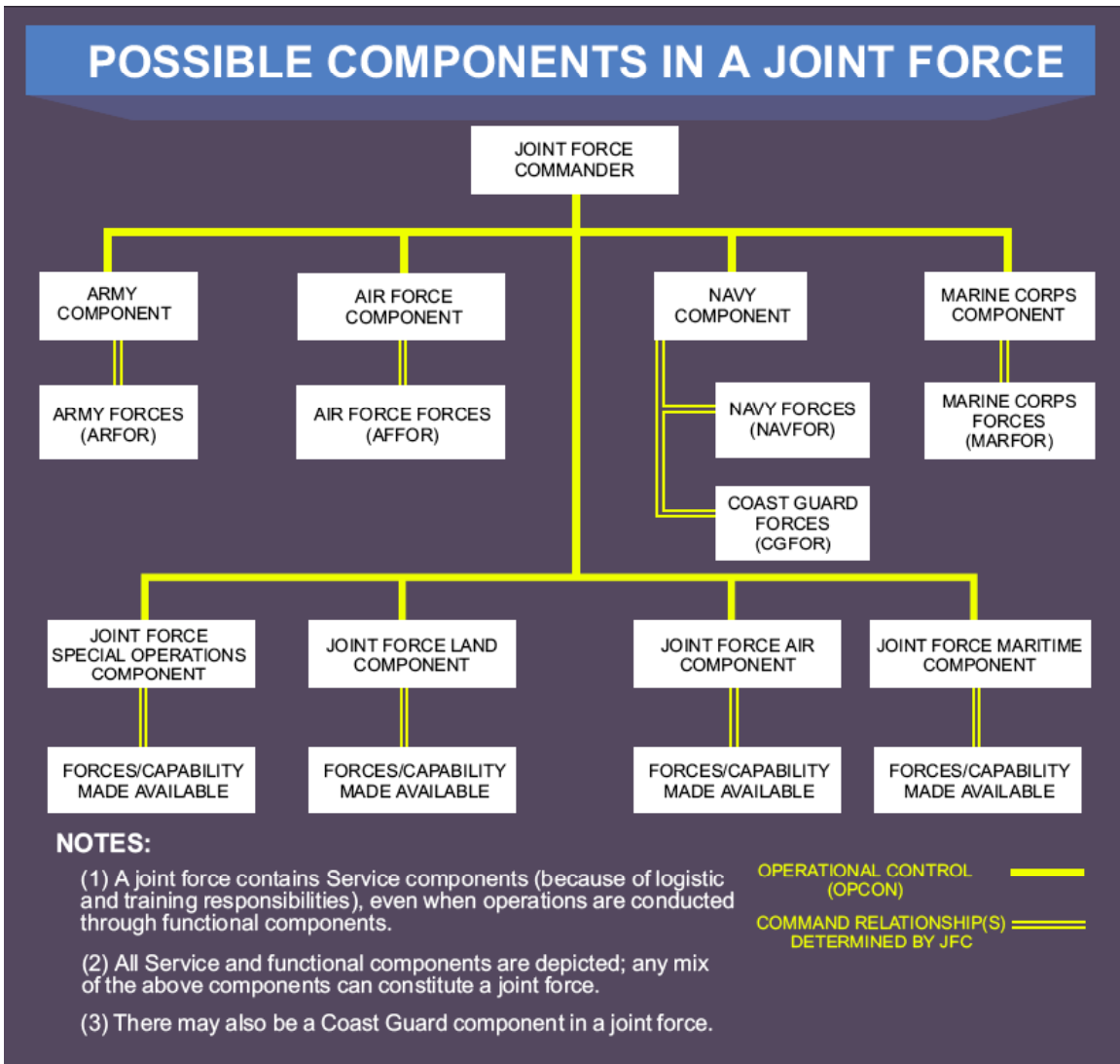


Figure 1. Possible Components in a Joint Force
 Source: US Joint Chiefs of Staff, Joint Pub 0-2, *Unified Action Armed Forces (UNAAF)*.
 (Washington, DC: US Government Printing Office, 10 July 2001), V-3.

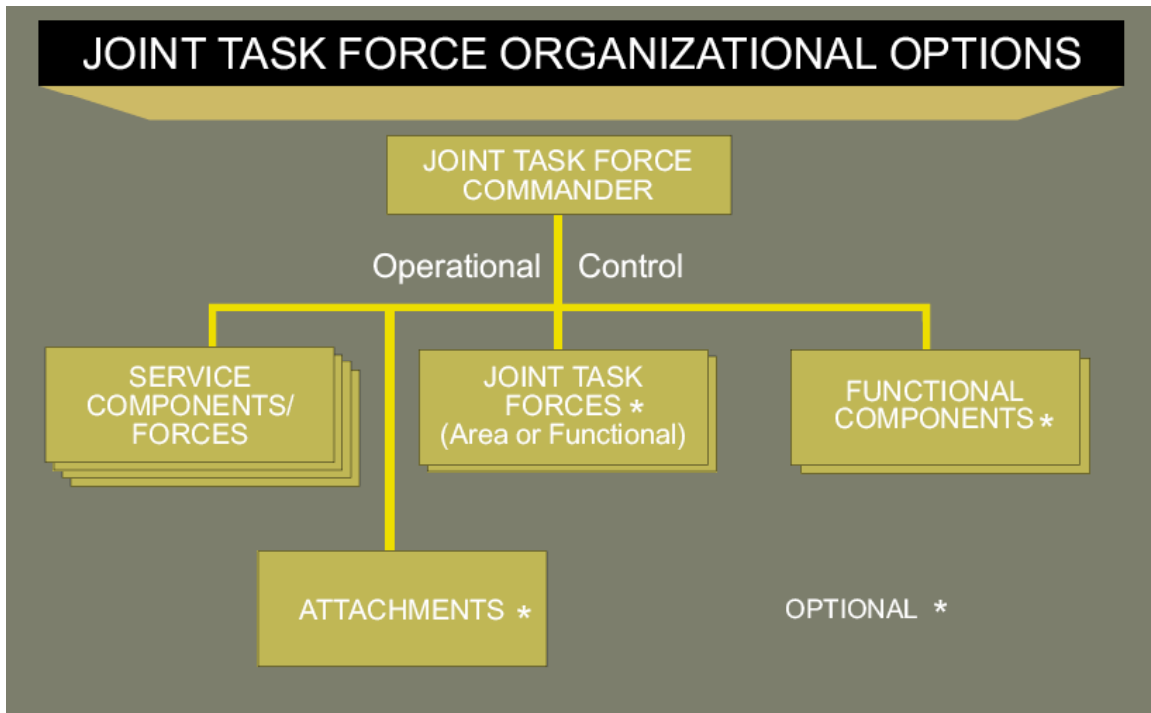


Figure 2. Joint Task Force Organizational Options

Source: US Joint Chiefs of Staff, Joint Pub 0-2, *Unified Action Armed Forces (UNAAF)*. (Washington, DC: US Government Printing Office, 10 July 2001), V-10.

Doctrinally, a JTF must include service components from more than one service, with the United States Navy and United States Marine Corps both considered part of the Naval Service. JTFs are normally organized with service components to carry out administrative and logistics responsibilities for the respective forces, and optional functional components to carry out actual operations (JP 3-0 2005b, II-15). JTF organizations typically employ functional components when operations require coordination and integration of similar capabilities of forces from two or more services (JP 3-0 2005, V-18). Functional component may have Operational Control (OPCON) over assigned forces, resulting in the ability to organize and employ forces, assign tasks and designate objectives, and give the authoritative direction required to accomplish the

mission. Logistics, administration, discipline, and unit training responsibilities remain with the service components. If functional components do not have OPCON, they will likely exercise Tactical Control (TACON) over assigned forces, which is limited to the direction and control of movements and maneuvers (JP 3-0 2005, III-4 to III-5).

While joint doctrine and the above figures do provide a foundation for describing a JTF organization, the study also sought to find a way to evaluate the JTF organization to answer the primary research question. This ultimately led to research in organization theory and Commander Stephen Olechnowicz's 1999 Naval Postgraduate School thesis. As explained in the literature review, Commander Olechnowicz desired to find a model "useful in predicting various aspects of operational organizational performance based on organizational architectures" (Olechnowicz 1999, xii). In other words, Olechnowicz wanted a way to measure the performance of JTF organizations in order to propose better ways to organize them. He justifies the focus of his research with the following statement:

With the advent of innovative technology and the willingness to dramatically change doctrine and organizational concepts, *new* organizational architectural designs can be developed that facilitate mission accomplishment, even when confronted with unusual missions or other drivers of adaptation. As a first step, the *definition* and *measurement* of organizational architectural dimensions need to be studied in order to establish a framework for the subsequent study and design of effective organizational architectures. (Olechnowicz 1999, 3)

In the case of this study, NCO is the driver of adaptation, and as the precursor to designing a new JTF organizational architecture, Olechnowicz's framework provides the means to evaluate the existing one to determine the aspects in need of change.

Organization theory characterizes organizational architecture as "multiple complex systems, called structures, that are rigidly or loosely tethered and enable the

organization to function” (Olechnowicz 1999, 14). Commander Olechnowicz’s study proposes five structures from classical organization theory pertinent to JTF organization. They are Command, Authority, Formal Communications, Informal Communications, and National Intelligence. This study does not consider National Intelligence, because it represents a source of information already intrinsic to NCO. The following sections discuss each of the four remaining structures.

Command Structure

Command structure refers to the hierarchy of how individual components are arranged. A hierarchy includes some number of levels, or echelons, of components, and also describes the number of subordinates beneath each mid-level component, or span of control. Figure 3 depicts a simple hierarchy with three echelons, each component at the top and middle levels having a span of control of two.

Simply Hierarchy Command Structure

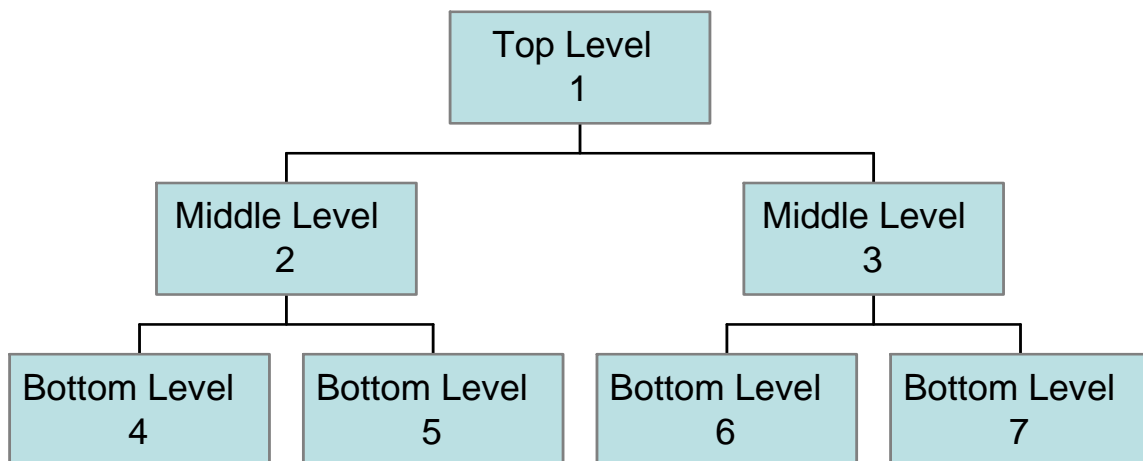


Figure 3. Simple Hierarchy Command Structure

The number of echelons and span of control define the height and width of an organization's command structure. These factors are often related, such that the narrower the span of control a component exercises, the greater the number of echelons (Daft 1998, 16). In military forces, the commander at each echelon determines his appropriate span of control based on a number of factors, including the total number of forces subordinate to the commander and the different functions or missions the subordinates might have. Ultimately, more echelons result in more layers that data, information, and knowledge must pass.

As figure 2 indicates, JTF commanders (CJTFs) normally designate the number of subordinate components according to the number of service components and the number of functions to be carried out, such as land, air, and maritime functions. This means that in a JTF conducting major combat operations, the JTF organization will normally have seven components beneath the commander, at a minimum, with a service component for each of the four US military services and a functional component for each of the three primary functions. Functional components may also exist for requirements such as special operations.

The subsequent command structure for forces beneath the level of service and functional components will vary. The resulting structure may be a few echelons deep, or as in the case of the land component command structure in Operation Iraqi Freedom, eight echelons may exist between the CJTF and the most junior soldier (Fontenot, Degen, and Tohn 2005, 54).

Authority Structure

Authority structures describe how the hierarchal command structure actually operates. This structure specifies the flow of authority in the hierarchy, explaining the relationship between vertically connected components (Gibson, Ivancevich, and Donnelly 1973, 289). The flow of reporting parallels the flow of authority, both implying a directive flow of leadership (Olechnowicz 1999, 16).

The previously discussed concepts of OPCON and TACON are the principal examples of military authority structures. OPCON and TACON detail the directive leadership a commander has over assigned forces and resources in a JTF. OPCON provides a greater degree of authority, including the ability to define a subordinate's tasks and purpose as well as reorganize it. Additionally, a commander may designate a subordinate as the supported element among all the subordinate elements. This designation gives the supported commander relative authority over the other peer elements in the same echelon to determine aid, protection, or sustainment requirements (JP 0-2 2001, III-9).

These authority structures and the associated reporting flow can place competing loyalties on a commander. In many cases, a the commander of a higher component in the organization will select the forces and resources of a subordinate component and give another component TACON authority over them. As an example, aircraft from the airwing assigned to a carrier and thus under the OPCON of the maritime component commander may be placed under TACON of the air component commander by the CJTF. This may lead to conflict between the obligations an aircraft has to the carrier and

directions given by the air component commander. These varying lines of authority are a common occurrence in the JTF, and the example provided is a daily reality.

Communication Structure

The communication structure is the extent to which each component in the hierarchy can communicate with other components. Communication may exist between components subordinate to different components one level above (component 4 to component 6), or even across the hierarchy (component 2 to component 6). Figure 4 uses dotted lines to represent some possible communication links in the previous hierarchy example.

Simply Hierarchy Communication Structure



Figure 4. Simple Hierarchy Communications Structure

The overall communication can be sub-divided into formal and informal communication structures. The formal communication structure consists of the lines of authorized official communications. This structure is a result of all the commanders’

directives detailing which subordinate components can officially communicate with external components without restraint (Olechnowicz 1999, 54). These officially determined communications links usually come in the form of Direct Liaison Authorized (DIRLAUTH). As stated in Joint Publication 3-0:

DIRLAUTH is that authority granted by a commander (any level) to a subordinate to directly consult or coordinate an action with a command or agency within or outside of the granting command. DIRLAUTH is more applicable to planning than operations and always carries with it the requirement of keeping the commander granting DIRLAUTH informed. DIRLAUTH is a coordination relationship, not an authority through which command may be exercised (JP 3-0 2005, II-11).

These lines of communication may not remain permanent, and commanders will often establish them as a convenience to remove themselves as middlemen. In the case of the carrier airwing example, the maritime component commander might authorize the airwing to initiate communications with the air component commander regarding the TACON authority relationship.

The informal communication structure represents the informal links and discussions that occur. These links are determined by the various components for themselves rather than their senior components. One example is individuals within different components using E-mail or phones to unofficially pass information of interest. Informal communication may have the same effect at coordinating and sharing information as formal communications, but it is not a recognized relationship.

Convergence and Divergence Between NCO Attributes and JTF Organizational Structures

Evaluation of the current doctrine defining the organization of JTFs relied on a qualitative comparison with the NCO attributes presented in section one of this chapter.

The evaluation did not seek to provide a quantitative measurement of effectiveness for current JTF organizations, but rather to examine the joint doctrine to determine where it converges and diverges with attributes significant to conducting NCO. Specific joint publications examined include: JP 0-2, *Unified Action Armed Forces (UNAAF)*; JP 1, *Joint Warfare of the Armed Forces of the United States*; JP 3-0, *Joint Operations*; JP 3-05, *Doctrine for Joint Special Operations*; JP 3-30, *Command and Control for Joint Air Operations*; JP 3-31, *Command and Control for Joint Land Operations*; JP 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*; JP 3-60, *Joint Doctrine for Targeting*; JP 4-0, *Doctrine for Logistic Support of Joint Operations*; and JP 5-00.2, *Joint Task Force Headquarters*. In addition to providing a relative assessment of the doctrine, the evaluation also identified specific friction points that should be addressed in order to design more network-centric JTF organizations.

NCO Attribute of Size and JTF Organizational Architecture

The *Network Centric Operations Conceptual Framework* identifies size, or number of individuals, as a contributor to the effectiveness of network-centric organizations, but it does not provide a relative metric to measure the attribute. This does not prevent size from being a relevant attribute regarding JTF organizational structures, though, for the size of a force directly impacts the JTF structures. Whether one looks at size in terms of individual people in a JTF or as formal groups of people from fire teams of soldiers or divisions of aircraft up to service and functional components, the number of groups determines the JTF's organizational architecture.

The size of a JTF and its components determines the width and depth of the JTF's command structure hierarchy. Though the number of functional components in the

hierarchy may be constant from JTF to JTF, additional units will broaden the echelons below. The span of control of subordinate elements does depend on many variables including command and control, and the command and control capability inherent to NCO will ultimately allow spans of control to widen and incorporate more units.

Although joint publications do not prescribe a certain span of control, Army Field Manual 5-0, *Army Planning and Orders Production*, does indicate that commanders can effectively control between two and five subordinate units, with additional units ultimately leading to the need to create lower echelons (FM 5-0 2005, F-2). Practically speaking, the Army does not organize from the top down, but rather the bottom up. The basic unit is a soldier, and the first echelon above that is determined by how many soldiers a superior could control. Typically, the fighting forces organize three to five soldiers into a fire team and a senior soldier in lead, with then three fire teams in a squad under a squad leader. Two or more squads then form a platoon, with the organization leading to higher and higher echelons, based on the concept that commanders at each level can only control a limited number of subordinates.

As the size of the organization and thus the hierarchy grows, the authority structure and the command structure grow more complicated. Functional components may delegate OPCON down their respective cascading echelons, but each component commander may retain the authority at a different level. Likewise, the formal communication structure grows denser with the continued requirement to facilitate communications across the width and depth of the hierarchy, connecting components at various echelons and under different branches of the hierarchy.

Ultimately, this *Network Centric Operations Conceptual Framework* attribute does not indicate that network-centric organizations decrease in effectiveness as they grow in size. Rather, current doctrine does drive larger JTF organizations to increasing complexity, and the attribute as a metric depends on whether the technology of NCO can account for the increasing complexity.

NCO Attribute of Structure and JTF Organizational Architecture

As noted in the first section, the *Network Centric Operations Conceptual Framework* defines multiple facets of the structure attribute, but only provides a measure related to the distribution of entities within an organization. The metric associated with this NCO attribute only assesses a continuum between a highly hierarchical organization and a flattened organization, which does not actually account for the nature of the authority relationships or connectedness across the hierarchy. The metric assigns the highest value to a flattened organizational structure, indicating that organizations optimized for NCO will have width of entities with little depth, or numbers of echelons.

Current JTF command structures cannot attain the ideal of a flattened organization, and as described with regards to Army hierarchy, are likely the most hierarchical command structures possible. A total flattening of JTF hierarchy would result in resources answering directly to the JTF commander, with no service components acting as force providers in between. Besides the challenge of span of control, current doctrine, based on US statutory code, gives the service components responsibility for training and equipping their respective forces.

Joint doctrine applies other restrictions to JTF organization that prevent flattening the command structure. One of the most notable restrictions concerns close air support (CAS). Navy and Air Force CAS aircraft both operate either under OPCON or TACON to the air component commander when supporting ground forces. Under current doctrine that relies on historical precedence, US Marine Corps aircraft providing CAS remain under OPCON authority of the Marine Air-Ground Task Force, and thus the ground component commander (JP 0-2 2001, V-4). This exception also holds true for US Army aviation rotary-wing assets operating as part of a combined arms team with ground forces (JP 3-09.3 2005, I-5). Marine and army leaders argue the need for the variation because of a desire to maintain centralized control of their organic assets, but in terms of the command structure, it actually adds echelons and branches to the hierarchy.

One of the doctrinal authority structure relationships also adds layers to the hierarchy. As describe previously, commanders can designate a subordinate as a supported unit. This status gives the supported unit authority to determine aid, protection, and sustainment requirements for peer units providing support, creating a *de facto* senior-subordinate relationship. Essentially, “the supported commander will have the authority to exercise general direction of the supporting effort, while the supporting commander determines the forces, tactics, methods, procedures, and communications to be employed in providing this support” (US Joint Forces Command 2004, 109). An example from Operation Iraqi Freedom (OIF) portrays how the relationship adds a layer.

During OIF, the US Army’s V Corps and the US Marine Corps’ I MEF both came under the control of the land component commander, Lieutenant General (LTG) McKiernan. Both commands shared similar missions and a common boundary leading

towards the battle for Baghdad. Lieutenant General McKiernan planned to designate V Corps as the supported commander, creating a single commander for I MEF and the other forces to support, in essence adding an echelon of command and creating more hierarchy.

Interestingly, because I MEF was transferred to the land component commander under a TACON authority relationship, Lieutenant General McKiernan could not reorganize the marines under another commander. This meant that instead of the single V Corps commander, the Baghdad fight had peer commanders on each side of the river, each reporting to the land component commander. According to the US Joint Forces Command's OIF lessons learned, "In retrospect, CFLCC [Combined Forces Land Component Commander, Lieutenant General McKiernan] dividing Baghdad into a two Corps area of operations and retaining command of the Baghdad fight turned out to be successful" (US Joint Forces Command 2004, 109). Though the land component commander wanted to use existing doctrine to add a layer of authority, the lessons learned indicate the "flattened" architecture worked.

Overall, from current doctrine regarding JTF organizations diverges from the flattened hierarchy most highly valued in the NCO attribute of structure. While one can assume that a limitation to increasing spans of control will diminish with robust NCO Technical Area capabilities, specific doctrine that creates senior-subordinate relationships among peer units adds more hierarchy. Additionally, current doctrine places responsibility for maintaining aspects such as equipping and training the distinct service forces at an intermediate component in the JTF hierarchy, relying on service specific middlemen. Current doctrine does not drive the JTF towards a more flattened organizational hierarchy.

NCO Attribute of Interdependence and JTF Organizational Architecture

As discussed before, interdependence is the degree to which different entities within an organization play unique roles while working towards a common goal and depend on each other for essential capabilities instead of reproducing them organically (US Joint Chiefs of Staff 2005a, 17). The concept of interdependence is not new. In fact, over two decades ago, several joint operations went so badly and had such significant shortcomings, that the U.S Congress passed the Goldwater-Nichols Act of 1986 to reform the military in this critical area.

A poignant example of the severe lack of interdependence in the early 1980s comes from Operation Urgent Fury on the Caribbean island of Grenada. General Schwarzkopf, then commander of the Twenty-fourth Mechanized Division, took part in the joint operation initially as a senior army liaison and later as deputy to the JTF commander, Vice-Admiral Metcalf. The initial attempt to rescue hundreds of detained American medical students on the southern end of the island went awry when it was determined that many of the students were actually staying two miles away from the campus dormitory in a beachfront hotel. US Army Rangers and Airborne troops were on the ground at the school campus, but an opposing force of armed rebels blocked the way to the students.

General Schwarzkopf made note of US Marine Corps helicopters sitting idle on the deck of the amphibious command ship, and recommended the helicopters be used to pick up the soldiers and fly them around the rebels to rescue the students. The response to his suggestion from the Marine colonel in command of the battalion landing team was, “We don’t fly Army soldiers in Marine helicopters” (Schwarzkopf 1993, 294). Needless

to say, the helicopters did fly the mission for the army soldiers, but more than just reflecting the military culture at the time, the colonel's comment reflected that joint organizations at the time did not share resources.

Though the Goldwater-Nichols act has driven many changes to joint acquisition, planning, and operations in the US military, it still has not brought "interdependence" into the lexicon. The term appears less than five total times throughout all the joint publications listed, as surveyed and when it does appear, it's as an ideal, without practical guidance on how to organize joint forces to achieve it.

When joint forces do recognize the need to turn to a specific service capability, the hierarchical command structure pushes coordination to the highest level, often between service or functional components. Units in the same relative echelon but under different components typically do not have the authority to coordinate and provide services for one another, much less task each other directly. The hierarchy and associated authority structure can create isolating "stovepipes," even within a single service component, as noted by Center for Strategic and International Studies author Anthony Cordesman in his initial review of OIF. With regards to the US Army, current doctrine "overemphasizes 'netting' at higher levels of combat organization at the expense of both battalion-level netting of combat elements and all aspects of logistics and sustainment" (Cordesman 2003, 207). The Army's transformation to modular brigade combat teams attempts to address logistics shortfalls at the battalion level, but the solution only provides more organic resources to units at lower levels rather than interdependence across the force.

Overall, logistics and sustainment represents one of the primary pathways to an interdependent joint task force. Currently, though, joint doctrine places directive authority for logistics at the level of the Combatant Commander, normally senior even to the JTF commander (JP 0-2 2001, III-2). As previously noted, service components retain authority for logistics of their own forces, and joint force commanders “ensure support is coordinated and integrated throughout the operation” (JP 3-31 2004, IV-14), but not actually interdependent. Logistics for the services are not completely independent of each other either, for doctrine does provide for common-user logistics (CUL). Often the Army provides considerable levels of CUL to other services, multinational partners, and even non-governmental agencies throughout the theater and joint operations area. Examples of CUL that other services might depend on include water production and fuel, and the Marines can also provide limited CUL to other service component forces depending on the overall plan for the JTF (JP 3-31 2004, IV-14). The Army may not receive support of the same significance from the other services as a like exchange, but the concept of interdependence does not necessarily require reciprocity.

The JTF does not conduct logistics in a vacuum, and the operational task of sustaining the force may rely on other operational tasks for success. The combination of operational tasks requires an even higher level of interdependence though, and as pointed out previously, is an organizational challenge even within the confines of a single service. Just as combat forces depend completely on logistical support, sustainment forces require protection of their stockpiles, refueling points, and supply convoys. Joint doctrine does provide for a Joint Rear Area Coordinator to oversee operations in the rear area and provide security for movements. In OIF, however, combat forces moved faster than

logistics, often leaving the lines of communication vulnerable. The hierarchical forces, accomplishing their different missions, were not prepared for the non-contiguous battlefield and the force protection challenges accompanying it. This came to light as a shortfall, for logistics forces

were not properly organized or equipped to operate as the kind of highly independent elements needed to support high rates of combat unit maneuver and intense combat in an environment where the combat elements of U.S. land forces did not provide anything approaching the past level of effort to protect logistic and support forces by securing the flanks and rear areas of maneuver operations (Cordesman 2003, 207).

In a highly interdependent force though, the logistics forces should not have needed organic combat power.

Another example where the highly hierarchical structure of the service components leads to overlapping organic capabilities is within the operational task of intelligence, surveillance, and reconnaissance (ISR). Currently, all the services have their own unmanned aerial vehicle (UAV) assets with similar capabilities, but limited structures exist to share data, much less cross-task other service assets for critical information requirements. Even in the cases where multiple services are relying on the same national ISR assets, they do not share the products. In OIF, each service still primarily distributed ISR information to their respective forces, and thus had “a series of unique organizational, technical, and communications solutions to the circulation, processing, and dissemination of ISR data” (Cordesman 2003, 185). Data exchange means such as the Secret Internet Protocol Router Network (SIPRNET) exist, much like the future Technical Area capabilities envisioned in NCO, but no authority in the JTFs has established the formal communication structure required.

One set of significant formal communication structures does exist within joint doctrine that facilitates interdependence for JTFs. The JTF commander and his staff may establish various boards, centers, and cells to connect the functional components across a variety of operational tasks, including logistics and ISR. The most widely used board is the Joint Targeting Coordination Board (JTCB), composed of representatives from all the service or functional components. Typically, the board coordinates lethal and non-lethal means to achieve desired effects on the enemy. Each component nominates specific targets that will lead to the overall effect, and the JTF commander or his appointed representative prioritizes the targets and allocates the combined available resources of all the joint forces towards them (JP 3-60 2002, II-5).

The JTCB provides much flexibility in generating interdependence of resources in the JTF. If one component's nominated target is not prioritized highly enough to be pursued, the component might offer additional resources that could be used for other targets. As an example, the maritime component might nominate a mobile anti-ship missile battery that an aircraft carrier is vulnerable to. The JTF commander may decide it is less important than fixed surface-to-air missiles (SAM) batteries threatening the air component's aircraft, and not select to destroy the anti-ship missiles based on the available resources. At that point, the maritime component commander might make available additional resources, such as Tomahawk Land Attack Missiles, to destroy the fixed SAM batteries in order to free the more flexible aircraft to destroy the anti-ship missiles. The JTCB meets daily to coordinate these types of effects, and it is a key means of interdependence in the JTF.

As a whole, joint doctrine for organizing JTFs seems to diverge from the NCO attribute of interdependence. While certain formal communication structures as the JTCB foster a sharing of resources for a common goal, they are primarily required because the hierarchy divides the resources. Each service maintains overlapping organic resources and incorporates them into the JTF organization, creating often unused assets rather than relying on a set of unique capabilities. The vision of network-centric interdependence is that “units across the echelons will no longer need the same degree of organic capabilities to achieve mission success because they can confidently rely upon their ability to access capabilities that they require, but which are provided by other units, organizations, or individuals” (US Joint Chiefs of Staff 2005a, 18).

NCO Attribute of Synchronization and JTF Organizational Architecture

The precedent for synchronization in NCO is the self-synchronizing or self-coordinating concept traced throughout the literature review. As Vice Admiral (VADM) Cebrowski’s original article visualizes the concept, NCO “enables forces to organize from the bottom up—or to self-synchronize—to meet the commander’s intent” (Cebrowski and Garstka 1998, 32). According to the *Network Centric Operations Conceptual Framework*, the emphasis has shifted from self-synchronization as a means to NCO to synchronization as an outcome, where planning, decisions, actions, and all force elements are synergistic. There may be times, such as in the pursuit of high value assets with strategic implications, that the JTF organization may have to control all forces tightly, but in most cases, the ideal is for command and authority structures to enable

units to coordinate decisions and actions without guidance (Alberts and Garstka 2004, 91).

As noted previously, the *Network Centric Operations Conceptual Framework* further expresses synchronization as the extent to which the organization is conflicted, deconflicted, or synergistic. These terms are subjective as metrics and certainly do not provide precision, but they do illustrate a relative continuum on which to place the relevant doctrine used to organize JTFs. One can apply these metrics of synchronization to a JTF's organizational doctrine in the terms of planning, decisionmaking, and actions.

At the low end of the scale, conflicted organizations have two entities or actions that interfere with each other, of which an example would be casualties as a result of friendly fire. A deconflicted organization has its entities or actions prevented from interfering with each other by separation in space, time, or both, of which military control measures are examples. In a synergistic organization, entities or actions reinforce each other's desired effects on the enemy and the environment. Combined arms teams present the historical model of synergistic effects, while a more current example would be reinforcing an unconventional warfare campaign's efforts to garner indigenous support by financial means with demonstrations of the lethality and availability of precision guided munitions (Alberts and Garstka 2004, 91).

With regards to the bottom up process of organizing, joint doctrine clearly diverges and places the genesis for action with the JTF commander. Joint Publication 0-2 does indicate that JTF commanders "seek to minimize restrictive control measures and detailed instructions" (2001, III-14), using implicit communication through the commander's intent and mission-type orders. The commander's intent is a unifying idea

for all subordinates representing the desired outcome, allowing units to exercise initiative under that umbrella of direction. Likewise, mission-type orders direct a certain task, but do not specify how to carry it out, allowing the subordinate freedom in the details of execution (JP 0-2 2001, III-14).

The commander's intent and mission-type orders both generate initiative for subordinates to take action, but they do not give subordinates the freedom to cross the command and authority structure boundaries to arrange themselves in time and space. In some cases, the authority structure may even prevent a functional component from reorganizing its subordinates to better arrange them in time and space. As noted in OIF, Lieutenant General McKiernan wanted to delegate authority for ground forces down to V Corps, but because I MEF was placed under TACON to the land component commander, the relationship could not change without higher approval. The desired supported and supporting relationship between V Corps and I MEF would have generated synchronization, but again, Lieutenant General McKiernan would have been creating the relationship from above.

Aside from the fact that the command and authority structures in joint doctrine drive the organizing process from the top down, joint doctrine provides many mechanisms such as DIRLAUTH to provide coordination as part of the formal communication structure delineated by higher authority. In some cases, the coordinating mechanisms only accomplish deconfliction, but many generate synergy across planning, decisionmaking, and operations.

The JTCB mentioned in the previous section take part during one of the first steps in synchronizing the joint targeting process of the JTF organization. The overall process

exists to minimize the possibility of duplicated or conflicting actions when imposing lethal and non-lethal effects on an enemy, and the JTCC facilitates target nomination and prioritization to ensure the JTF commander's intent is met. It serves to create interdependence among the functional components for resources, and ultimately leads to the synchronized pairing of specific targets with the appropriate component's resources.

While the joint targeting process represents the synergistic level of synchronization, the JTF organization carries out target prosecution through means of coordination and deconfliction. Specific products the joint targeting process generates are the air tasking order (ATO) and the airspace control order (ACO), which put the plan in motion for air missions. Operating in the middle of the synchronization spectrum, the ATO and ACO deconflict air operations in both time and space, directing aircraft where to go and when. The ACO often designates restricted airspace for certain periods of time, putting air operations in series rather than parallel. During the major combat operations in OIF, over 1800 airspace control measures existed, and the functional components had to deconflict 750 ship based Tomahawk Land Attack Missiles from air operations and over 400 army Advanced Tactical Missiles from air operations (Cordesman 2003, 184).

The JTF also uses separation in space to deconflict other forces, designating specific areas of operation for land and naval forces to coordinate and deconflict operations within the joint operating area. At succeeding echelons, commanders create borders to divide the geography along the boundaries of organizational hierarchy and deconflict forces all the way down to the smallest unit.

The methods the JTF organization uses to synchronize its forces are countless. As with the joint targeting process, the planning process often reflects synergy,

implementing itself through measures of coordination and deconfliction. The result lies somewhere between deconfliction and synergy, continually moving and very subjective. Overall, the formal structures of the JTF enable the organization to move towards synergy, but the authority structure drives the synergy down rather than allowing it to come as a groundswell from the lowest units in the hierarchy. This combination actually leads JTF organizational architecture towards convergence with this NCO attribute, for as the *Network Centric Operations Conceptual Framework* reiterates, “the point is that synchronization is the objective. Self-synchronization is one of the means, but not the only way, to achieve synergy” (Alberts and Garstka 2004, 91).

Summary

This study sought to determine if the US military can use the current doctrine for organizing a joint task force (JTF) to implement the concept of NCO. The DoD has clearly defined capabilities and attributes an organization must display as part of NCO in documents written by the Joint Chiefs of Staff, Office of Force Transformation, and the Assistant Secretary of Defense for Networks and Information Integration. Likewise, joint doctrine publications lay out the framework for JTF organization, a framework that one can describe in terms of the command, authority, and communications structures. By evaluating the overall organizational architecture through the lens of each attribute, this study was able to determine where current doctrine converges and diverges with the intended functioning of network-centric organizations.

First, the study looked at the JTF organization as a function of size. While the specific NCO attribute does not provide a relative measure according to size, it is clear

that the larger the JTF, the more complex the command structure becomes as represented by its hierarchy.

Next, the study determined that the NCO attribute of structure primarily assesses an organization's hierarchy, preferring a flattened hierarchy to one with many echelons. Joint doctrine addresses span of control as a limitation in how many subordinates a commander can control, typically requiring more echelons. Additionally, joint doctrine specifically delineates roles for service components the JTF commander cannot fill, requiring an echelon in the hierarchy between fighting forces and the top of the organization. Likewise, authority structure relationships such as supported and supporting create additional de facto echelons, deepening the hierarchy.

Next, the study considered the JTF organizational architecture in terms of interdependence among the various components. It was determined that, while certain communication structures exist to facilitate interdependence, the highly hierarchical nature of the organization tends to encourage overlapping capabilities and prevent reliance on single entities for unique resources.

Lastly, the study evaluated the JTF organization to determine the extent to which joint doctrine facilitates synchronization. Doctrine provides for a JTF to pursue common goals and objectives through communication of a commander's intent and use of mission-type orders. The JTF organization works towards synergy by planning, and then carries out its plans through measures that coordinate units by deconflicting them in time and space. This section also evaluated the apparent lack of self-synchronization at lower levels in the hierarchy due to constraints of the authority structure, but did not include the results in the overall analysis since current NCO concepts do not exclusively require this

type of self-coordination. Ultimately, the study determined that joint doctrine is converging with the NCO attribute of synchronization as JTF organizations operate somewhere along a continuum between deconfliction and synergy.

Overall, the results of the analysis show that joint doctrine diverges from NCO concepts in the organization of JTFs and does not match the capabilities and attributes required to conduct NCO. The primary aspects of divergence are the command and authority structures of the JTF, while joint doctrine provides communication structures that typify a network-centric organization. Chapter 5 provides further interpretation of the analysis and makes recommendations in light of the findings.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

We can never forget that organization, no less than a bayonet or an aircraft carrier, is a weapon of war. We owe it to our soldiers, our sailors, our airmen, and our marines to ensure that this weapon is lean enough, flexible enough, and tough enough to help them win, if God forbid, that even becomes necessary. (March 2004, II-1)

Congressman Bill Nichols, Hearings for the
Goldwater-Nichols Act, 1986, *JP 3-31*

The Department of Defense (DoD) has embraced the concept of Network Centric Operations (NCO) in its transformation from an industrial age military to an information age military (US Office of Force Transformation 2005, 3). NCO strives to increase information sharing, information access, and speed through networking forces together, ultimately enhancing mission effectiveness. DoD's primary efforts have focused on developing the technology underlying the concept, but realizing the capabilities of a network-centric force crosses the spectrum of doctrine, organization, training, material, leadership, personnel, and facilities. According to JP 1, Joint Warfare of the Armed Forces of the United States, "future force development calls for an integrated system in which change in any area is reconciled with the others. Their interrelationships must be addressed simultaneously" (2000, VIII-5).

The lack of new joint doctrine addressing network-centric capabilities in joint organizations led to the formulation of the primary research question: Can the US military use the current doctrinal organizational architecture of a joint task force to implement Network-Centric Operations? By determining what attributes a joint task force (JTF) should display to "be net-centric" and then examining how the organizational

architecture of a JTF converges and diverges with those attributes, the study sought to highlight both where joint doctrine is applicable and where it needs to change.

Conclusions and Recommendations

This chapter will summarize the analysis conducted in chapter 4 and present relevant conclusions and recommendations. The chapter presents these conclusions and recommendations in terms of each organizational structure, first covering the communication structure, then the authority structure, and finally the command structure. After reviewing the analysis and resulting conclusions and recommendations, the chapter also proposes future areas of study regarding development of JTF organizations for NCO.

Communication Structure

As noted in the analysis of the interdependence and synchronization NCO attributes, joint doctrine for the communication structure of the JTF converges towards producing a network-centric organization. The doctrine primarily covers the formal aspects of the communication structure, connecting nodes of the organization through Direct Liaison Authorized (DIRLAUTH) and certain coordination forums such as boards, centers, and cells. The combined number of possible boards, centers, and cells totals over twenty according to the Joint Task Force Headquarters Master Training Guide, and crosses the spectrum of operational objectives such as movement and maneuver, logistics, intelligence, and force protection.

The use of various boards, centers, and cells closely matches the vision for future network-centric organizations, comparable to the Communities of Interest (COIs) concept in the *Network Centric Operations Conceptual Framework* and the *Net-Centric*

Environment Joint Functional Concept. Generally, COIs will be temporary organizations within the JTF, formed to address specific problems and issues, but they may be standing or permanent to handle persistent issues (US Joint Chiefs of Staff 2005a, 16). COIs may be formal or informal, and can either form as the result of top-down efforts from the JTF commander or self-organize from the bottom up. COIs will be information driven and distributed across the Global Information Grid (GIG), creating virtual organizations without the additional attendant hierarchy.

The difference between current doctrine and future concepts is that COIs will operate across all echelons, whereas current doctrine does not provide access for entities at the lowest levels of the hierarchy to participate in boards at the functional component level. Technology has certainly been the primary limitation to connecting all forces across the hierarchy, but as bandwidth increases and communications capabilities are pushed down to the lower levels, more participants should be brought into boards, centers, and cells. Boards such as the Joint Targeting Coordination Board (JTCB) should distribute meetings and briefings through video teleconferencing and electronic blackboards available on the GIG, increasing situational awareness through shared information and knowledge. This would facilitate greater access to the joint targeting process throughout the JTF and move it beyond the realm of just the JTF commander and his functional or service component commanders.

Operation Anaconda, a controversial combat operation in northern Afghanistan during March 2002, provides a good example of how increased transparency through the widespread use and access to appropriate boards, centers, and cells could have benefited the outcome. For a variety of reasons, commanders at the top echelons of the joint force

placed a limitation on certain key resources such as artillery. As planning progressed across various components at lower levels in the JTF hierarchy, some ground planners assumed air assets would make up the shortfall of artillery support, but the plan did not filter down to the aircrews who would actually be on tap to fly the missions (Naylor 2005, 137). Likewise, participants throughout the operation had different expectations and understanding of how air power would be brought to bare, leading to greater assumed risks. Some special operations forces thought that air assets would conduct a fifty-five minute long bombing preparation of the battlefield, while air assets actually had limited targets that they engaged in less than one minute (Naylor 2005, 154-155, 207-208). If all participants had really understood what resources were available and how the forces were synchronizing, vulnerabilities in the plan that may have lead to the resulting casualties could have been mitigated.

Ultimately, joint doctrine needs to lead the way in directing greater access. Current technology can allow geographically separated entities at all levels in the hierarchy to better share information, but doctrine should facilitate the technology use. As network-centric capabilities in the Technology Domain become more available, it should not be assumed they are being used to the full extent. Rather, as Joint Publication 1 states, “Force development exploits fully the capabilities of the individual and the best available technology, guided by joint doctrine that seeks to maximize the effects of American combat power” (JP 1 2000, III-2). The underlying organizational components of a network-centric communication structure exist, but joint doctrine needs to broaden the use and access of boards, centers, and cells to participants throughout the force, especially down the hierarchy, to increase interdependence and synchronization.

Authority Structure

Joint doctrine explicitly defines the elements of the JTF authority structure through levels of authority in the terms Operational Control (OPCON), Tactical Control (TACON), and Support. Joint doctrine also contains Combatant Command (COCOM) as the highest level of authority, but it is not relevant in the JTF organization since COCOM is reserved above the level of JTF commanders exclusively for the regional and functional combatant commanders of the Unified Command Plan.

As noted in the analysis of the NCO attributes of interdependence and synchronization, these doctrinal elements of the JTF authority structure do not correspond with the ideals of a network-centric organization. In all cases, the direction to take action flows down the hierarchy with the authority, restricting initiative at the lower levels. The most restrictive level of authority, and probably the more common, is TACON. By only providing for control and direction of movement and maneuver, it prevents lower echelon forces from establishing new relationships across the hierarchy on their own, including sharing of resources and synchronizing action.

An example of how these levels of authority limit synergy in the force highlights the seam between functional components. Airborne command and control assets, such as Air Force E-3 AWACS (Airborne Warning and Control System), routinely direct air interdiction sorties beyond the lines of friendly ground troops and the ground commander's fire support coordination lines based on the authority of the air component commander. Aircraft conducting the air interdiction are either OPCON or TACON to the air component commander, and thus also under the authority of the E-3. Other aircraft,

such as attack helicopters, are under OPCON or TACON of the ground component commander, and thus do not come under AWACS authority.

If an E-3 is prosecuting targets with aircraft under its control and resources run out, the E-3 does not have the authority to task nearby helicopters. Even if the attack helicopters have the requisite interdiction capabilities and the opportunity exists for them to attack the targets, the E-3 cannot assume the authority, and the helicopters cannot place themselves under E-3 authority. Regardless of whether the resulting effect would meet the overall JTF commander's intent and the helicopters' use would not reduce the acceptable level of resources for the ground commander, the authority to coordinate the action exists at the component commander level in the hierarchy. For a military evolving its technology towards NCO, the doctrine inhibits efficient resource use and synchronization between efforts of the functional components.

Based on the analysis, a change to the levels of authority needs to take place. One option would be to create an authority relationship comparable to the Command by Negation option the US Navy uses in its Composite Warfare Commander (CWC) concept. In CWC, communications and data links provide a common operating picture to network all entities together. Command by Negation gives individual units broad authority to carry out predetermined actions based on the threat, using voice reports or other actions in the data link to keep the warfare commander apprised (NWP 3-56 2001, 2-2). Lower echelon units are able to take initiative to carry out the commander's intent, and the overall warfare commander only takes action when required to intervene against subordinate action. This concept succeeds in maritime mission areas from undersea

warfare to anti-surface warfare, and is especially effective in the dynamic environment of anti-air warfare.

In NCO, one could not predetermine all the possible actions a subordinate might take, but the technology of NCO will network entities across the entire JTF and allow commanders throughout the command structure to see all proposed actions. In the case of the previous example, the E-3 would designate the target in real time and then “pair” a weapon or asset such as the attack helicopters to the target, taking into account threat capabilities and desired effects. The pairing would be visible on a common operating picture that everyone would share, backed up by a voice report if required. The attack helicopters would accept or decline the mission depending on their status, which could even indicate their availability beforehand, and the engagement would take place unless any higher echelon commander interceded.

One could argue that in a complex area of operations with numerous engagements this might translate to an overwhelming span of control, but the solution then becomes a technological method of screening and displaying only relevant information. Commanders have battle staffs to manage operations in tactical operations centers, and delegating Command by Negation authority would not stifle initiative at the lower echelons. Additionally, while various phases of operations will still require preplanned missions and established authority relationships, the increased speed of decisions cycles in the information age requires more dynamic tactical initiative at all echelons.

Ultimately, a level of authority comparable to Command by Negation could achieve the same results as totally decentralizing command, control, and execution. This is not to say that decentralized command and control is always desired. As indicated in

the analysis, some actions, such as engaging high value targets, have strategic implications of which the JTF commander might want to retain close control. For most operations, however, drawing the JTF organization into greater interdependence and synchronization requires placing doctrinal authority to carry out the overall JTF commander's intent at lower levels. As addressed in the previous section, joint doctrine should change to reflect the emerging technological capabilities to extend situational awareness across the JTF, in this case by either modifying existing levels of authority or adding new ones.

Command Structure

The NCO attributes analyzed in chapter 4 explicitly value a flattened command structure and hierarchy. Doctrinal JTF organizations clearly diverge from this ideal. Current joint doctrine merges distinct service organizations into a larger organization, and as the JTF organization grows in size, it invariably adds depth in terms of echelons and thus complexity to the hierarchy.

Functional differentiation among the services and span of control are the primary considerations leading to intermediary echelons, both of which impact other NCO attributes. In the case of differentiation between the services, overlapping or redundant capabilities and resources often exist among the services, breaking down interdependence in the JTF. With regards to span of control, limiting the number of entities a unit can control increases the depth and complexity of the hierarchy. This results in a more complex authority structure that requires synchronization across the JTF organization. In short, current joint doctrine creates stacked hierarchies that also complicate JTF interdependence and synchronization.

A completely flattened organization would place operational forces directly under the control of a JTF commander, with no service or functional components or intermediary echelons. This structure of the JTF organization may be the hardest to evolve. It is clear that joint doctrine creates a hierarchy, but before joint doctrine removes service and functional components and additional echelons, some clarification needs to be made as to what extent the *Network Centric Operations Conceptual Framework* intends for hierarchy to flatten. Current JTF organization may inhibit interdependence and synchronization, but joint doctrine should evolve through transitional steps rather than radically changing the command structure into a collapsed JTF hierarchy.

One intermediate step is to discard the current division of functional components by environment (land, sea, and air) and adopt a new set of functional components. The Universal Joint Task List (UJTL) provides a list of objectives and associated tasks for joint organizations to accomplish at the strategic, operational, and tactical levels of war. As noted in chapter 1, JTFs function at the operational level of war by translating theater and national security strategy into military operations and campaigns, commanding and coordinating tactical unit actions across the spectrum of warfare. The UJTL divides operational tasks under seven objectives (CJCSM 3500.04D 2005, B-C-C-1 to B-C-C-9):

1. Conduct Operational Movement and Maneuver
2. Provide Operational Intelligence, Surveillance, and Reconnaissance
3. Employ Operational Firepower
4. Provide Operational Logistics and Personnel Support
5. Provide Operational Command and Control
6. Provide Operational Force Protection

7. Counter Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) in the Joint Operations Area.

Organizing functional components according to the seven operational objectives provides a method to increase interdependence and synchronization in the JTF by assigning the forces by operational task to the associated component. A functional component overseeing objective four would also accomplish the requirements that service components now provide for their respective forces under current joint doctrine, allowing for the dissolution of service components. A precedent already exists for organizing operational level forces under the UJTL objectives. Lieutenant General McKiernan, ground component commander during major combat operations in Operation Iraqi Freedom, divided his staff along the UJTL objectives for planning and operations of coalition ground operations (Fontenot, Degen, and Tohn 2005, 43-44).

The reorganization of forces under joint tasks and objectives is an initial step. Once JTFs begin to employ forces in this manner, habitual relationships through boards, centers, and cells or COIs could replace the organizational hierarchy and provide virtual organization that would give the JTF commander sufficient span of control. Currently, the highly hierarchical JTF organization of joint doctrine diverges from desired NCO attributes. Joint doctrine must change to facilitate the technology of NCO and achieve increased mission effectiveness.

Recommended Topics for Further Study

The DoD should conduct additional studies of operational level organizations using the *Network Centric Operations Conceptual Framework* as an evaluation tool. First, this would validate the identified organizational characteristics and behavior

attributes as valid means of assessing network-centric organizations. It would also generate clarification of how to apply the attributes and their associated metrics, a function that was hard to perform with no existing examples. As more studies evaluate NCO based on organizational design, the analysis will point to additional aspects of joint doctrine that must evolve. The US Army War College's Center for Strategic Leadership is completing a thorough study of ground forces during major combat operations in Operation Iraqi Freedom, but no studies exist that examine larger operational level organizations that include multiple functional components.

At some point, future studies will also need to examine JTF organizations in other phases besides major combat operations. The *Network Centric Operations Conceptual Framework* and the *Net-Centric Environment Joint Functional Concept* claim application of NCO to stability and reconstruction, although no studies exist for those operations. As civil support and stability and reconstruction operations grow more prevalent in US military tasking, appropriate doctrine for organizing network-centric JTFs will become critical. Likewise, all phases of operations are increasingly including inter-agency governmental partners, and future doctrine must provide guidance for incorporating those entities into evolving organizations.

Lastly, the Office of Force Transformation needs to study the impact of implementing NCO in the US military to coalition operations. As the US military reshapes its joint organizations to conduct NCO, the resulting architecture will affect operations with coalition partners. Changing command and authority structures must still account for coalition technology and techniques across the range of networking capabilities.

Summary

The bottom line is that current joint doctrine guiding JTF organization does not match the capabilities and attributes required to conduct NCO. Current command and authority structures limit interdependence and synchronization in the JTF and require changes. Joint doctrine does provide key coordinating mechanisms, but they must extend to all echelons of the force to truly connect the JTF for NCO. Joint doctrine cannot stagnate, for “failure to coevolve technological, organizational, and doctrinal innovation may lead to inefficiencies in the deployment and utilization of net-centric systems and concepts” (US Joint Chiefs of Staff 2005a, 36). Though NCO seeks an increase in mission effectiveness rather than efficiency, in any case, doctrine must change to realize any enhanced benefit and advantage.

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