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**Identity and Coordination in Combat Networks' Social Domain**

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### *Abstract*

This paper illustrates how principles derived from social network theory and organizational sociology can be applied to three fundamental 'social domain' components of network centric operations: (1) formation of combatant identities, (2) roles emerging from organizational values, and (3) distributed intelligence as the coordination of relationships among identities and technologies. The premise of this paper is that network positions are contexts for action by identities, whereas ties represent individuals' repeated efforts at mitigating perceived uncertainty in immediate and future situations. A review of relevant empirically grounded research is done to reveal consonance with key themes in network centric warfare studies as well as methodological avenues for a social domain-focused research agenda. Given that current literature suggests the need for attention to 'socio-technical networks,' the ultimate ambition involves both modeling combat network topologies that satisfy desired outcome variables and more fully understanding social practices at the core of modern warfare.

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<sup>1</sup> This paper benefited from discussions at the NATO SAS-050 Peer Review Workshop (October 2005) and the "Organizations and Interactive Technologies" and "Identity and Control" graduate seminars at Columbia (Fall 2005). I am indebted to Chris Danbeck, Amy Garcia, Ben Jensen, Allan Silver, David Stark, and Harrison White for valuable insights. An ongoing comparative project with Frederic Godart, "Organizing Identities and Meanings," has also generated many useful ideas for this paper.

## ***Introduction***

### *Concepts and Processes in Network Centric Operations' Social Domain*

This paper argues that frameworks rooted in social network theory and organizational sociology can allow for further exploration of the “social domain” of network centric operations (NCO) while building conceptual ties to the cognitive, information, and physical domains.<sup>2</sup> The sociological concept of networks describes ties among individual identities as the bases for patterns of relations and action. This framework emphasizes an empirically tenable view of social process predicated on the constraints and opportunities associated with individuals’ network positions. I also claim that crafting a research agenda for the NCO social domain will require both establishing features of combat network topologies (currently done in several ongoing research efforts) in addition to social factors that shape how combatants interact with others, superiors, and technologies.

The underlying idea of *socio-technical networks* in command and control research recovers the importance of the social: the ties that bind combatants together, within a unit, a division, a service, and the entire armed forces community. But social ties necessitate mediation, especially in the contemporary period during which interactive technologies are re-shaping the way human beings relate to each other in government, corporate, academic, and other settings. Analytically, socio-technical networks in combat situations are composed of identities (commanders, combatants, and staff), expertise (command logics and protocols), and technologies (instruments and weaponry) in the pursuit of the physical negation of an enemy threat through the organized application of violence.

The proposed application of this network-based approach to the NCO social domain is based on three key concepts:<sup>3</sup>

(1) Identity formation: All individuals are connected to various social networks through some array of ties, e.g. according to one’s hometown, place of education, or professional field. Individuals’ different identities emerge and change according to positions in these networks because ties imply access to different sets of meanings. As examples, consider how individuals develop appreciation for different types of art, different linguistic idioms according to region, or customs among colleagues in an organization. Identities are continually generating and modifying ties by *attaching meanings to other identities and objects*. Human identity and behavior—both in everyday life and in tightly bounded organizations, e.g. combat units—are thus fundamentally social phenomena. Combat operations are necessarily concerned with attributing identities and establishing meanings for given persons, sites, targets, and programs, as they seek the mitigation of battlespace

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<sup>2</sup> As one study notes, “The Social Domain (SD) of NCW conceptual framework is the least developed and tested. Social issues do, however, remain central to the way that actors within groups behave.” See M. Adkins and J. Kruse, “Case Study: Network Centric Warfare in the U.S. Navy’s Fifth Fleet: Web-Supported Operational Level Command and Control in Operation Enduring Freedom,” University of Arizona Center for the Management of Information, 2003, 24.

<sup>3</sup> My approach draws heavily from two particular bodies of work. Whereas that of Harrison White furnishes a theory of action, research by David Stark in several areas provides a framework for the study of innovation, including Hungarian firms before and after the collapse of socialism and financial traders pre- and post-9/11.

uncertainty—the “fog of war.” While ongoing network topological studies have developed some preliminary metrics for identifying hubs and other key identities in NCO, it is also necessary to qualitatively understand what properties of networks yield the observed patterns of social behavior among identities.

(2) Roles from organizational valuations: Roles are identities assigned by formal organizations according to activities that are collectively desired and valued. Such values can be understood as attempts to establish order and comparability among personnel according to standards developed throughout the organization’s history. These *valuations* are imposed both through formalized protocols and informal rituals, thus orienting the formation of social roles. A key question for NCO research is the possibility of friction between current Service and functional valuations and distributed “edge” logics. Although NCO ties are more laterally organized, there is presumably the need to preserve the intent and responsibility of the commander – a critical role. Relevance for coalition operations or combatant relations with ethnic communities in mission areas is also discernible.

(3) Distributed intelligence as organizational coordination of identities: Examining coordinated activity among identities in some organized context also requires capturing how individuals interact with the instruments and artifacts of their engineered environments. Therefore, distributed intelligence is here described as the *laterally organized production and utilization of battlespace information across personnel, instruments, and spaces*. This definition implies a particular configuration of a military organization’s identities and desired roles. Based on this structure, identities and roles will determine whether appropriate recombinations of tactical knowledge achieve desired lethality and adaptability. Below I review how concepts such as “edge organization” or “heterarchy” address this concept of distributed intelligence.

Significant defense community-based research has been done on elucidating how social network concepts bear on warfare as a result of interactive technologies, resulting in the formulation of network centric theories of warfare as a set of organizing principles.<sup>4</sup> Indeed, leading experts emphasize connectivity as an enabler of desired kinds of social action in their development of this theory of war:

“NCW is built around the concept of sharing information and assets. Networking enables this. A network consists of nodes (entities) and the links among them. Nodes do things (sense, decide, act) and information, both as inputs to decisions and in the form of decisions themselves, is passed over links from one battlespace entity, or node, to another.”<sup>5</sup>

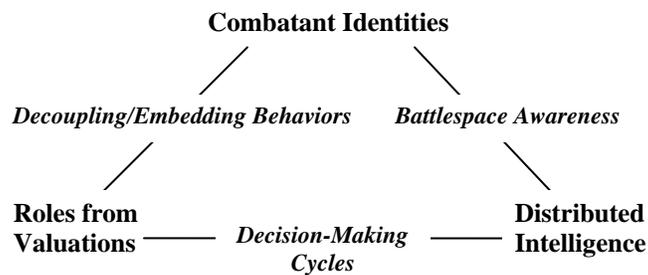
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<sup>4</sup> D.S. Alberts, J.J. Garstka, and F.P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority*, 2<sup>nd</sup> Edition, DOD C4ISR Cooperative Research Program, 2000, 94. D. S. Alberts, R. Hayes, D.S. Alberts and R. Hayes, *Power to the Edge: Command...Control... in the Information Age*, DOD Command and Control Research Program, 2003.

<sup>5</sup> Alberts et al. 2000, 94.

The aforementioned concepts are related to three processes on which important research has been conducted in operations research and defense literatures. Understanding these concepts is integral to improving performance of network centric operations in the following three areas. Distributed intelligence in networked forces is intended to increase combatant's ability to mitigate the effects of the "fog of war" by increasing *battlespace awareness*. This involves the ability to identify an enemy, interrupt its awareness mechanisms, and destroy it. Distributed intelligence will necessarily affect and be affected by ties particularly in the speed of *decision-making cycles*. Concatenations of network ties are reproduced and oriented by valuations, trust, and training. Individual combatant identity, its configuration, and connections to others in a combat unit will also depend on *decoupling* of undesirable identities (e.g. partisan persuasions) as well as *embedding* of identities that are consonant with networked combat forces. This is the intent of training and drills more generally. Embedding of behaviors and practices is also important for each service and functional specialty.

Figure 1 is a stylized analytic scheme meant to illustrate how the social domain might be approached. While bold terms represent the key concepts explored in this paper, italicized terms indicate processes linking such aspects of combat networks.



**Figure 1.** Analytic Scheme: Social Domain of Network Centric Operations

The following section will briefly address the utility of applying multiple research methods to this problematic. Discussions of each of the three social domain analytic components will follow, to be concluded with a discussion of implications for future work.

### *Methodological Considerations*

Network ties have been traced within and across organizational or group boundaries of various kinds, e.g. high school students, job seekers, residential communities, firm managers, or organizations themselves within a given industry.<sup>6</sup> Networks in organizations have also been studied so as to understand internal configurations of ties that enable distributed intelligence

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<sup>6</sup> For seminal texts, see H.C. White, S.A. Boorman and R.L. Breiger, "Social Structure from Multiple Networks I: Blockmodels of Roles and Positions," *American Journal of Sociology* 81 (730-780), 1976; R.K. Merton, "The Role-Set: Problems in Sociological Theory," *British Journal of Sociology* 8.2 (106-120), 1957; D.J. Watts, "The 'New' Science of Networks," *Annual Review of Sociology* 30, (243- 270), 2004; D.J. Watts, P.S. Dodds, and M.E.J. Newman, "Identity and search in social networks," *Science* 296 (1302-1305), 2002. For an important and generally sympathetic critique, see M. Emirbayer and J. Goodwin, "Network Analysis, Culture, and the Problem of Agency," *American Journal of Sociology* 99.6 (1411-1454), 1994.

across teams, protocols, instruments, and spatial arrangements.<sup>7</sup> If it is true that, in the phrasing of organizational theorist Charles Perrow, the organization “extracts from individual behavior the logic based on common goals and willing cooperation,” it is therefore incumbent upon researchers to formulate an understanding of how innovation through organizational networks emerges from interactions among identities and sub-groups.<sup>8</sup>

Studying social action in combat networks requires research that incorporates multiple methods. Qualitative evidence from ethnographic fieldwork or content analysis, done according to rigorous standards, can uncover important aspects of combatant experience that may elude simplified models. Such work can clarify theoretical assumptions and guide the formation of testable hypotheses. While mathematical modeling can successfully establish the parameters of local action, ethnographic study may also effectively capture how combatants respond to the exigencies of given network positions.<sup>9</sup>

Network topologies that provide “maps of relationships within an organization” and that assess “leadership, patterns of communication, vulnerability and the level of collaboration” should include both quantitative measurements and ethnographic investigations of the collective valuations that shape and are re-shaped by combatant action over time.<sup>10</sup> For example, discovering the presence of certain network hubs does not necessarily explain why they are hubs or the degree to which a given force construct is operating according to NCO principles. Therefore, datasets of email, chat, and voice-over-IP should be complemented by content analytic methods, thus moving from “who communicates with whom” to “*why* do they communicate?” and “what are they communicating *about*?” Each of these media implies that different actions are enabled and constrained. As White et al. noted in a foundational methodological article on network blockmodeling, “Eventually one must be able to show how concrete social processes and individual manipulations shape and are shaped by structure. A natural next step, then, is to identify how flows of information and other transactions relate to images [of social network structure] and their change.”<sup>11</sup>

Of course, predictive power is desired of modeling. But certainly this must be accomplished in numerous ways. As one ethnographer of the intelligence community has suggested, “Forecasting is not simply a linear logical argument but rather a complex interdisciplinary, dynamic, and

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<sup>7</sup> See, for examples, D. Stark, “Heterarchy: Distributing Intelligence and Organizing Diversity” in J. H. Clippinger (ed.), *The Biology of Business: Decoding the Natural Laws of Enterprise*, San Francisco: Jossey-Bass Publishers, 1999, 153-179; E. Hutchins and T. Klausen, “Distributed Cognition in an Airline Cockpit,” in Y. Engeström & D. Middleton (eds.), *Cognition and Communication at Work*, New York: Cambridge University Press, 1998.

<sup>8</sup> C. Perrow, *Complex Organizations: A Critical Essay*, New York: McGraw-Hill, 1986, 68.

<sup>9</sup> Four excellent organizational studies incorporate qualitative work to understand complex organizational forms: E. Hutchins, *Cognition in the Wild*, Cambridge, MA: MIT, 1996; R. Johnston, *The Culture of Tradecraft: An Ethnography of the US Intelligence Community*, Central Intelligence Agency, 2004; E. Lazega, *The Collegial Phenomenon: The Social Mechanisms of Cooperation among Peers in a Corporate Law Partnership*, New York: Oxford University Press, 2001; D. Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*, Chicago: University of Chicago Press, 1996. The studies engage, respectively, the organization of cognitive systems on a Navy amphibious helicopter transport, organizational culture in the intelligence community, the practice of collegiality in a law firm, and the problematic handling of scientific evidence at NASA.

<sup>10</sup> D.A. Jarvis, Alidade Inc., “A Methodology for Analyzing Complex Military Command and Control (C2) Networks,” 10<sup>th</sup> ICCRTS, 2004, 2-3.

<sup>11</sup> White et al. 1976, 773.

multivariate task. Cases are rare where one key variable is known and weighed appropriately to determine an outcome. Generally, no single static variable predicts behavior; rather, many dynamic variables interact, weight, and value change, and other variables are introduced or omitted to determine outcome.”<sup>12</sup> Therefore, it is through multiple research methods that social processes in combat networks can be best understood and captured. An attempt to capture ‘the social’ cannot be built up from static, self-reported ‘personality’ traits. As early as 1976, White and Breiger stated, “...social structure is regularities in the patterns of relations among concrete entities.”<sup>13</sup> Distilling those patterns from social process is key to modeling network topologies according to desired outcome variables.

Analysis based on static categorizations of persons implies profound passivity on the part of the actor and suggests that he or she is ultimately reducible to a collection of innate proclivities. Furthermore, theorizing of cognitive functions based solely on psychological variables cannot fully account for the bases of intense social bonds among combatants universally described by both veterans and observers of combat operations as “unit cohesion.”<sup>14</sup> ‘Personality’ is *itself* an emergent property, not an explanatory variable, and therefore cannot explain levels of social action in warfighting, which by its nature is a collective enterprise. For example, an identity’s ‘ambiguity tolerance’ of situations involving family-social contacts is quite distinct from those contacts found in an employment setting. With a spouse, ambiguity is generally not tolerated: one wishes his or her spouse to be thoroughly *unambiguous* in how their tie is defined. In contrast, when a colleague first enters a work situation, ambiguity is initially tolerated and accepted, although persons seek its attenuation as they develop an account of this newly encountered identity. Can he or she be a reliable, trustworthy colleague, or must I be wary? As White states, “Ties are portrayals of connections, but these are not once-and-for-all objective interconnections among fixed identities.”<sup>15</sup> How identities generate and identify ties should be acknowledged in social domain research.

As I have suggested, the ultimate ambition of this research agenda involves understanding which network topologies result from changes in organizational behaviors and practices. One study suggested an interesting hypothesis as to the kind of social process emerging from network centric operational units: “In a network organization, informal social networks should spontaneously emerge in response to a given situation and supersede formal organizational structures, such as those depicted in organizational charts. These networks may involve members, or parties, from different sectors and different levels.”<sup>16</sup> This paper’s approach could

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<sup>12</sup> R. Johnston, “Integrating Methodologists into Teams of Substantive Experts,” *Studies in Intelligence* 48.1, Center for the Study of Intelligence, Central Intelligence Agency, 2003, 3-4.

<sup>13</sup> White et al. 1976, 733

<sup>14</sup> For a range of interesting studies using anthropological approaches to U.S. military culture, see P.R. Frese and M.C. Harrell (eds.), *Anthropology and the United States Military: Coming of Age in the Twenty-first Century*, New York: Palgrave Macmillan, 2003.

<sup>15</sup> H.C. White, *Identity and Control: A Structural Theory of Social Action*, Princeton, NJ: Princeton University Press, 1992, 67 (2<sup>nd</sup> edition forthcoming in 2006).

<sup>16</sup> L. Warne, I. Ali, D. Bopping, D. Hart and C. Pascoe, “The Network Centric Warrior: The Human Dimension of Network Centric Warfare,” DSTO Systems Sciences Laboratory, Edinburgh, Commonwealth of Australia, 2004, 5; See also S.R. Atkinson and J. Moffat, *The Agile Organization: From Informal Networks to Complex Effects and Agility*, DOD Command and Control Research Program, 2005, and M.P. Fewell and M.G. Hazen, “Network-Centric Warfare – Its Nature and Modelling,” DSTO Systems Sciences Laboratory, Edinburgh, Commonwealth of Australia, 2003

further explore this line of investigation in terms of how this “spontaneous” emergence occurs and what roles enable bonds that sustain effective, enduring cooperation. My intent here is to offer only an initial framework for a social domain-focused research agenda.

### ***Combatant Identity: Triggerings of Meaning***

In the social network literature, significant attention has been paid to measurement of network connections and to “[explaining] certain behaviors or processes through the fact of social connectivity itself – as well as through the density, strength, symmetry, range, and so on, of the ties that bind.”<sup>17</sup> In addition, other important features of network structure have involved the costs associated with communicating or coordinating across a tie (time to access medium, communication uplink time and others factors are of critical importance in the military operational context), and network centralization, which can be operationalized as “the extent to which the ties are centralized in a small number of group members...,” thus yielding what are referred to as network hubs.<sup>18</sup> Simulations have also tested network structural robustness by simulating effects of tie deletion. Another study found that network centralization had a consistently positive effect on collective organizing action under conditions of significant resource or interest heterogeneity, explained by the fact that collective action organizers could select in whom they wished to invest organizing resources.<sup>19</sup>

With such studies as background, a central contention of this paper is that combatants’ identities are not static variables; they are socially triggered and dynamic. As Watts et al. stated in their discussion of “small world” network modeling, “Individuals in social networks are endowed not only with network ties, but identities: sets of characteristics attributed to them by themselves and others by virtue of their association with, and participation in, social groups.”<sup>20</sup> Positions in network structures trigger identities in everyday social situations and in carefully organized military operational contexts. To mitigate uncertainty, identities seek some accountings of themselves and the surrounding environment as a way to make sense of the jumble of social forces around them.<sup>21</sup> Technologies as human tools and instruments can themselves be viewed as such efforts at control.

Both battlespace operations and long-term institutional development in the military involve decoupling behaviors associated with individuals’ previous identities that may be mismatched with expectations of commanders and instructors, perhaps related to regional custom or partisan affiliation. As has become well-known through the work of military researchers, “discipline and regimentation are intimately related to the body and subjectivity.”<sup>22</sup> Certainly, the concept of identity described here is distinct from standard views of identities as only gender, racial, ethnic or national individual characteristics.<sup>23</sup>

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<sup>17</sup> Emirbayer and Goodwin 1994, 1419.

<sup>18</sup> G. Marwell, P.E. Oliver, and R. Prael, “Social Networks and Collective Action: A Theory of the Critical Mass. III” *American Journal of Sociology* 94.3, 1988 (502-34), 503.

<sup>19</sup> Marwell et al. 1988, 527-529.

<sup>20</sup> Watts et al. 2002, 1303

<sup>21</sup> White 1992, ch. 1.

<sup>22</sup> J. Linford-Steinfeld, “Weight Control and Physical Readiness among Navy Personnel,” in Frese and Harrell 2003, 107.

<sup>23</sup> Key concepts applied here are adopted from White 1992.

Individuals in a combat network are necessarily engaged in the attribution of identities, based on some source of information; identities of friends, enemies, and neutrals must be ascertained and specified. For example, an ethnography conducted aboard a Navy ship notes one aspect of Navy intra-service distinction, “At all levels of organization we see attempts to establish identity by distinguishing oneself from the other groups.... the dynamics of the relationships among the people engaged in the task of navigation are in part constrained by these identities.”<sup>24</sup> Such constructions of military identities also occur through social rituals such as the West Point “mortification” custom by which cadets are decoupled from previous identities and instead embedded into a distinct cadet one that embodies values meant to orient all West Point identities. Initiation rites and formal training are only different aspects of this process by which the combatant achieves a robust identity that could sustain the ability to achieve battlespace success. This would especially be the case with elite forces: difficult entries into elite forces are a further way to ensure commitment of identities. Once an identity and its reproduction are salient for an individual, he or she will seek to affirm this aspect of their person through some behavior, thus reproducing network structures.

Previous work has identified key hubs in networks and attributed the presence of such hubs in part to the principle of assortativity.<sup>25</sup> As Jarvis describes, “Assortative mixing occurs when nodes in a network show preferential linking to other nodes in the network. In social networks, hubs tend to connect with hubs.”<sup>26</sup> Yet why exactly are these hubs observed? How are they constructed? If it is purely indicative of functional organization of operational units, then the finding may be little more artifactual. If the *post facto* finding is that an intelligence officer primarily broadcasts over email, making him a high out-degree hub, what is the meaningful implication for NCO development?

Other methods have also proven useful for understanding empirically verifiable bases of social structure. The blockmodeling algorithms developed by White and others can establish “structural equivalence,” which involves a similarity of relations for two nodes with respect to a third actor in a network such that each could be replaced by the other. Relationally, then, they are equivalent. By partitioning a population and determining types of network ties, generated blockmodels were “interpretable as an abstract pattern among a few aggregate units that characterized the more detailed interaction among a larger population of individuals.”<sup>27</sup> This is relevant to the present discussion given that traditional military “hieratic” structure exemplifies structural equivalence in the following sense:

“Fighting requires unpredictable alignments and changes of neighborhood and cooperation; it requires constant respecification of information and of the interconnections of actions. Equivalence within a rank, with attention focused on invidious comparisons to other ranks, opens up connectivity within the rank to a much closer approximation of all the possibilities inherent in complete interconnection. There is

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<sup>24</sup> Hutchins 1996, 17.

<sup>25</sup> In the case of Jarvis 2004, this is a joint US/UK exercise.

<sup>26</sup> Jarvis 2004, 15. See also the discussion in N. Hanaki, A. Peterhansl, P.S. Dodds, and D.J. Watts, “Cooperation in Evolving Social Networks,” *Management Science*, 2006 (forthcoming).

<sup>27</sup> White et al., 1976, 772.

more freedom of maneuver to string together coalitions, because of equivalence within a level, and thus more leverage for overall control, given strict precedence between levels.”<sup>28</sup>

Questions remain as to whether (and how) formal and informal processes of identity formation under network centric operations will change as a result of different operating principles. The key question for the purposes of the present discussion is what forms of combatant identities are required for network centric operations and resulting exigencies placed on combatants. So NCO will involve attention to effects on identity formation from given network structure. As I have already suggested, a social domain research agenda will require both network metrics and qualitative evaluations of identity formation in combat networks. In particular, work is needed on *how* an identity engages instruments meant to increase situational awareness as well as *how* the aforementioned embeddings gradually become robust. As Alberts et al. have noted, “NCW requires significant changes in mindset and much greater understanding of the information that is available and the processes, tools, and agents that turn this collection of information into battlespace knowledge.”<sup>29</sup>

### ***Roles from Organizational Values***

“...As with any warrior culture, leaders emerged, lines of loyalty around those leaders were drawn, separations developed among the followers...and tribes were born. The tribes within our company evolved through predictable life cycles. Their longevity was a function of the loyalty toward their respective leaders. These leaders included the platoon sergeants, squad leaders, and vehicle commanders. It was not so much the position of the Marine that mattered, as it was the loyalty of this following. This loyalty was the air that breathed life into the lungs of the tribes.” – B. Williams<sup>30</sup>

Roles are identities associated both with collective meanings and needed tasks that are valued by an organization. Arising from the immediacy of human experience, combatant identities’ efforts at mitigating uncertainty consolidate as informal roles in addition to formal ones crafted by commanders and operational protocols. Some *valuation ordering* guides the formation of these roles as salient aspects of identities: “...control induces efforts to verify or regulate by comparison with some standard, if only implicit or relative or historical, which is to say to establish discipline by some linear order and thus some valuation.”<sup>31</sup> The well-documented and undeniable intensity of combat experiences clearly bears on how roles become durable social constructs. Roles are not merely symbolic, they are also determined and reinforced according to a specific vision of the organization’s goals. As one soldier in an Army briefing noted, “We know we’re not just working for a plan, we’re working for each other.”<sup>32</sup> The main point of this section is that the social structure of warfare is relational and derivative of socio-technical network structure, not built out of individual aggregates.

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<sup>28</sup> White 1992, 238.

<sup>29</sup> Alberts et al. 2000, 196.

<sup>30</sup> B. Williams, *Spare Parts: A Marine Reservist's Journey from Campus to Combat in 38 Days*, New York: Gotham Books, 2005, 81.

<sup>31</sup> White 1992, 28.

<sup>32</sup> “Every Soldier Is A Sensor,” Future Combat System feature, U.S. Army, [www.army.mil/fcs](http://www.army.mil/fcs), May 5, 2005

Formal and informal roles involving rank, service, station, and functional specialty all affect how individuals relate to one another, they reproduce these roles through interaction with other network nodes, that is, individuals. Consistency among actors' perceptions of an individual's role means that expectations ensue and social structure can be reproduced. For example, standing at attention upon boarding a Navy ship and facing the ensign reinforces both a common identity and certain positioning of roles, although there is certainly extreme differentiation within the spatial and social hierarchies of a ship.<sup>33</sup> Clearly, in the military context, roles and valuations from which they derive are traced and inscribed in protocols. The introduction of network centric operating principles implies a specific vision for the roles of individuals in the U.S. military. Understanding the formal and informal construction of combatants is vital to efforts aimed at forming valuations that are consistent with a distributed "edge" logic.

Previous social scientific bases for the study of group processes are also well grounded, including work by Merton, Stouffer et al.'s *The American Soldier*, and Katz and Lazarsfeld's *Personal Influence*.<sup>34</sup> Merton, a theorist of Industrial Age bureaucratic organization, adopted the definition of a role as "behavior oriented to [the] patterned expectations of others" and suggested its application to medical school students and teachers as examples.<sup>35</sup> Katz and Lazarsfeld used experiments to study information flows through interpersonal communication networks. They underscored Stouffer et al.'s finding that, "combat motivation was associated with attachment to an informal group. The protection of friends, for example, or the need to conform to primary group expectations was often given as the most important reason for willingness to enter battle."<sup>36</sup> Indeed, *The American Soldier* is still counted among the seminal set of volumes to apply social scientific methods to understanding perceptions of rank and file military personnel.

The problematic of which roles emerge, given network centric valuations, is thus key to developing a social domain-focused research agenda. Researchers have acknowledged this; as Alberts and Hayes write:

*"Power to the edge* involves a fundamental change in culture. Culture is all about value propositions and behaviors – about who and what is valued, and what constitutes appropriate behavior. *Power to the edge* involves changes in the way we think about the value of entities and desirable behaviors and interactions. Ultimately, this involves a redefinition of self and the relationship between self and others, and self and the enterprise."<sup>37</sup>

Understanding organizational valuations is critical to effectively capturing social domain processes in NCO. And it is here that sociological research can draw on substantial literatures in order to further conceptualize important determinants of the relationship between valuations and identities' action. A study done in the Navy noted an interesting constraint on roles, showing

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<sup>33</sup> Hutchins 1996, 11.

<sup>34</sup> Merton 1957; S. E. Stouffer, et al. *The American Soldier: Adjustment during Army Life*, Vol. I, Princeton: Princeton University Press, 1949; E. Katz and P. Lazarsfeld, *Personal Influence*, New York: The Free Press, 1955,

<sup>35</sup> Merton 1957, 110-111.

<sup>36</sup> *Ibid.*, 37.

<sup>37</sup> Alberts and Hayes 2004, 180.

how, “every individual plays his or her own role, but in doing so each person (in the tower, on the deck, the pilot) has to interrelate heedfully with the others. For instance, a pilot does not land his aircraft, he is ‘recovered’ by the people on board. On a flight deck there are no solitary acts. Hence, solitarily acting ‘strong’ individuals or commanders are not welcome there.”<sup>38</sup> Similarly, within the Army, the “aura of the commander” obtains in any situation, although personal leadership style may vary greatly. Somewhat speculatively, I suggest that, in contrast to other organizations in which valuations as norms constrain action by most actors, the Army context utilizes both strictly defined operational protocols on one hand and informally communicated intent and discretion of the commander on the other hand, as if he himself is imbued with the organization’s operational logic.

But to what extent do or could frictions emerge between traditional command logics and edge logics? One manner of addressing this issue has involved the argument that command intent can and, in some cases, should be decoupled from the commander’s role: “For the discussion of command in the Information Age, we will assume that, as is the case in virtually all recent operations, there is no single person in charge and we will separate the commander(s) from the function of command because commanders perform a variety of functions.”<sup>39</sup> This decoupling is premised on a distributed intelligence structure widely discussed and debated in different forms in organizational and management literatures. The challenge is then to “synchronize” combatant identities with command intent associated with a mission so as to embed and coordinate a networked force in which the “function of command [is] accomplished in a distributed and collaborative fashion.”<sup>40</sup>

Two further social domain problems emerge here, however. First, how are intraunit bonds of affect such as those discussed by Stouffer et al. affected by organizational shifts away from traditional command hierarchical organization? It may be conceivable that both “auras” and actual authority of certain roles would be affected. The question is not if the construction of roles through social bonds can be maintained in NCO, but how this will and must occur, given differently arrayed and connected force elements. Second, through what methods can designers of edge logics re-craft organizational valuations that may appear to be radical departures from standard command logics? Given that network centric operations are premised on fully harnessing Information Age capabilities, how can roles, particularly commanders’ roles, be imbued with a valuation of certain applied technologies?

### *Roles in Future War*

Meanings attached to roles and identities are not solely related to intraorganizational coordination. The “winning of hearts and minds” argument about securing post-conflict peace clearly takes up this important fact as it relates to national communities into which American armed force is projected. In addition to the challenge of enabling appropriate configurations of roles within an NCO framework, it is also useful to heed changes in the role-sets assumed by the military as an entire organization. Contemporary debates surrounding these roles in the twenty-

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<sup>38</sup> J.L. Soeters, D.J. Winslow, and A. Weibull, “Military Culture,” in G. Caforio, *Handbook of the Sociology of the Military*, New York: Kluwer Academic/Plenum Publishers, 2003, 248.

<sup>39</sup> Alberts and Hayes 2004, 205.

<sup>40</sup> *Ibid.*, 204.

first century are beyond the scope of this paper, but are nonetheless closely related to building an understanding of each NCO domain and how they interrelate. New role-sets for the U.S. military will inevitably mean internal re-configurations of roles and attendant valuations.

The fact that the operational landscape for the military has changed seriously since the end of the Cold War is a well-known conclusion that many scholars have reached, often accompanied with various proposals for a new vision of the military's role in international affairs. Generally, an emphasis has been placed on military operations other than war (MOOTW) conducted in concert with coalition allies. Theoretically, this has implied new roles for the combatant and evidence from the second Gulf War makes this readily apparent. Accordingly, a new "self-perception," a new accounting of combatant identities, will be necessary in this operational context.

Among others, one rather polemical account has argued that future war will mean not just the "power projection" for which the U.S. military is ideally suited, but also a "system administrator" role-set to which the military must adapt, as the recent conflicts in Iraq and Afghanistan seem to have made abundantly clear. Previous hierarchical logics of force projection will give way to a military involvement with capabilities in "postconflict security generation, humanitarian relief, and national reconstruction" and with a decision-making structure that "will necessarily sync up with those of the relief agencies and the international development organizations, and both sides in this civil-military marriage will learn to live with each other over the long haul."<sup>41</sup>

### *Distributed Intelligence as Organizational Activity*

Recent innovation in organizations, particularly firms, has emphasized a shift from vertically-oriented hierarchical structure to more laterally-oriented organization. Processing and collaboration across disciplines and organizational cultures become increasingly important. Rather than extol the benefits of centralized planning, organizational innovation in the era of new information technologies involves the ability to *co-evolve* with the rapid pace of change in productive capacities, availabilities in the supply chain, and personnel monitoring and performance. Different frameworks have emerged that attempt to capture this shift toward new organizing forms that harness capabilities of interactive technologies, highly skilled personnel, and the need to coordinate complex activities across distinct metrics, tactical logics, e.g. inter-service coordination, and what Stark has called "evaluative principles." As he has suggested, "If collaborative engineering involves the pragmatic activity of figuring out how everything fits together, it also involves the discursive activity of evaluating how it performs."<sup>42</sup> Such frameworks have included notions of "edge organizations," "complex adaptive systems," "project ecologies," and, quite relevant to the NCO social domain, *heterarchy*, which is discussed below.<sup>43</sup>

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<sup>41</sup> T.P.M. Barnett, *The Pentagon's New Map: War and Peace in the Twenty-first Century*, New York: Berkley Books, 2004, 321.

<sup>42</sup> D. Stark, "For a Sociology of Worth," in V. Borghi and T. Vitale (eds.), *Le convenzioni del lavoro, il lavoro delle convenzioni*, numero monografico di *Sociologia del Lavoro*, n. 102, Milano: Franco Angeli, 2006 (forthcoming).

<sup>43</sup> See discussion of complex adaptive systems in J. Clippinger (ed.), *The Biology of Business: Decoding the Natural Laws of Enterprise*, 1999.

This section maintains the network theoretical premise that, "...the nature of groups is determined by the intersection of the actors within them (i.e. by the ties of their members to one another as well as to other groups and individuals), while the nature of actors is determined by the intersection of groups 'within' them..."<sup>44</sup> It becomes important to incorporate a review of relevant work done on distributed intelligence mentioned above and discuss what consonances exist between this innovations originated in business firms and the future of NCO. Adaptability is here associated with being able to recognize new sources of innovative capacity. The concept of 'socio-technical networks' involves an acknowledgement that technologies as implements of human life are necessarily parts of social action, and should be analyzed as such especially in formal organizations. As Law notes, "...what we call the social is *materially heterogeneous*: talk, bodies, texts, machines, architectures, all of these and many more are implicated in and perform the 'social.'"<sup>45</sup>

To be sure, military organizations cannot escape problems found in other human collectives that, although they are oriented toward some common purpose or instilled with some common valuation, e.g. profit maximization in a corporation, will still feature cases of misbehavior and organizational deviance. As some have argued, within the military, "the 'cold' organization [the institutional military] knows all aspects of bureaupolitics as well: emotional meetings, power struggles, negotiations on targets, battles over budgets, as well as contacts with the media and other external, mostly political pressures,"<sup>46</sup> Yet the premise of NCO is that its operating principles will not buttress organizational pathologies, but will actually increase possibilities for horizontal accountability: "...it will be easier to hold individuals accountable for their actions because there will be a greater shared understanding than ever before. This includes an understanding of command intent, assigned resources, rules of engagement, and the status of one's assets."<sup>47</sup>

Additional contributions to these perspectives emerge from Hutchins' theory of distributed cognition, which asserts that human cognition is distributed culturally across others as well as devices, given their material embodiment of goals and expectations of purposive action. As Hutchins has proposed, "...information is propagated through a system in the form of representational states of mediating structures."<sup>48</sup> Material mediators also "constrain the sorts of cognitive processes required to propagate representational states into or out of that medium."<sup>49</sup> This argument is particularly salient given technological advances and their consequences for civic organizations, government bureaucracies, firms, and the non-profit sector. Done aboard a Navy ship in the North Pacific, his ethnographic work highlights how human cognition is actually distributed socially across other identities as well as instruments and their spatial arrangements. By investigating an actual organizational context in which human cognition must react to changing environments and unexpected contingencies, Hutchins' concept of distributed cognition attempts to merge concepts from anthropology and cognitive science. His intent in part is to illustrate that an understanding of human cognition cannot be reduced to attempts to

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<sup>44</sup> Emirbayer and Goodwin 1994, 1418.

<sup>45</sup> J. Law, *Organizing Modernity*, Oxford: Blackwell Publishers, 1994, 2 (emphasis in original).

<sup>46</sup> Soeters et al. 2003, 246.

<sup>47</sup> Alberts and Hayes 2004, 209.

<sup>48</sup> E. Hutchins and T. Klausen, "Distributed Cognition in an Airline Cockpit," in Y. Engeström & D. Middleton (eds.), *Cognition and Communication at Work*, New York: Cambridge University Press, 1998, 15.

<sup>49</sup> Hutchins & Klausen 1998, 19.

measure individual traits as innate factors that are thoroughly determinant of social action. As he writes, "...if groups can have cognitive properties that are significantly different from those of the individuals in them, then differences in the cognitive accomplishments of any two groups might depend entirely on differences in the social organization of distributed cognition and not at all on differences in the cognitive properties of individuals in the two groups."<sup>50</sup>

An important sociological concept of distributed intelligence is captured in the work on heterarchy, defined as an organizational form that features both a *distributed intelligence* across persons and instruments and an *organized diversity* of distinct evaluative principles. Thorough analyses of a Silicon Alley website design team and a Wall Street trading room reveal key features of this innovative form of binding identities and defining roles.<sup>51</sup> Ethnographic study of a new media firm in Silicon Alley reveals how heterarchical organization distributes intelligence through lateral accountability involving "interdependencies between divisions, departments, and work teams within the firm."<sup>52</sup> But this is not merely an attempt to flatten a hierarchy. Heterarchical operation also involves an organized diversity that permits "coexisting logics and frames of action."<sup>53</sup> Such diversity in a military is already present to a certain extent but is subjected to the primacy of a *single* evaluative principle: that of the commander. In another sense, however, heterarchical search in a financial trading room on Wall Street exhibits responses to exigencies similar to that of combatants, a similar attention to improving situational awareness:

"The cognitive challenge facing our arbitrage traders is the problem of recognition. On one hand, they must be adept at pattern recognition (e.g. matching data to models, etc). But if they only recognize patterns familiar within their existing categories, they would not be innovative.... Innovation requires another cognitive process that we can think of as re-cognition (making unanticipated association, re-conceptualizing the situation, breaking out of lock-in)."<sup>54</sup>

Just as these traders must be able to ascertain new patterns of information in order to make profitable transactions, so must combatants in NCO recognize patterns they were trained to engage and understand as well as detect and interpret new enemy behaviors and attach meanings to such observations.

The point here is that functions vital to the organization's success are not contained or departmentalized within certain specialized areas. As Stark has written, "...in place of specialized search routines in which some departments are dedicated to exploration while others are confined to exploiting existing knowledge, the functions of exploration are generalized

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<sup>50</sup> Hutchins 1996, 178.

<sup>51</sup> D. Stark and M. Girard, "Distributing Intelligence and Organizing Diversity in New Media Projects," *Environment and Planning A*, 34.11, November 2002, 1927-1949; D. Beunza and D. Stark, "How to Recognize Opportunities: Heterarchical Search in a Trading Room," in K.K. Cetina and A. Preda (eds.), *The Sociology of Financial Markets*, Oxford: Oxford University Press, 2004, 84-101.

<sup>52</sup> Girard and Stark 2002, 1934.

<sup>53</sup> *Ibid.*, 1929.

<sup>54</sup> Beunza and Stark 2004, 86.

throughout the organization.”<sup>55</sup> This is not an alien set of concepts for the military both in its organizational culture and its operating principles, including more recent attempts aimed at “taking division-level capabilities and pushing them down to the brigade level.”<sup>56</sup> Journalists’ accounts have also noted the salience of this imperative, such as Robert Kaplan, who notes that, “The Marines were a flattened hierarchy in the manner of the most innovative global corporations, with responsibility pushed out to the farthest edge of the battlefield. *Every marine a rifleman* was the literal truth.”<sup>57</sup> Presumably, however, NCO assumes an even more concentrated degree of organizational power being pushed to the edges.

The underlying premise (and promise) of heterarchies is that they are coordinated arrangements of control efforts aimed at mitigating uncertainty in ecologies characterized by rapid technological and structural change and widespread information availability. Given the dramatic uncertainty that obtains, laterally organized networks are considered better positioned to adapt to changes in the organizational environment through a distributed intelligence across persons, departments, and instruments as well as the inclusion of a diversity of evaluative principles and performance metrics. The rationale is that decision-making benefits from coordinated and consistent interaction, even overlap, among different ways of evaluating a given problem. In this manner, existing information about how to achieve success can be exploited while new *recombinations* of tactical knowledge can develop. In addition, distributed intelligence and authority enables accountability and coordination to be devolved across a network, which necessarily includes team personnel, instruments and applied devices, observed protocols, and spatial configurations in which they are arrayed.

### ***Implications for Further Research***

This paper has sought to lay a basis for a social domain-focused research agenda by offering an analytic scheme that captures key components of combatant social action. If, as has been written, NCO implies that “command decisions would migrate closer to the pointy end(s) of the spear,”<sup>58</sup> then sociological research can yield a clearer understanding of the socially embedded behavior of the ‘spear’ in such a combat network. The argument is also advanced that building on findings by network measurement studies, qualitative work can ascertain (1) the practices by which individuals actually make use of technologies associated with distributed intelligence, (2) properties of hubs and the nature of their formation, and (3) the formal and informal practices through which actors enact ‘network centric valuations.’ In short, such a research agenda aims to understand the phenomenological processes through which the combat network is constructed.

Mathematical simulations, topological studies, and ethnographic work have engaged the issue of robustness and adaptability in the face of system attacks or failures. It seems appropriate to incorporate such methods into the social domain, particularly given its crucial links to the remaining domains. In a sense, the social could capture much of what is occurring in the cognitive domain, given that human cognition is itself socially distributed. As Hutchins notes,

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<sup>55</sup> D. Stark, “Heterarchy” in J. Clippinger (ed.), *The Biology of Business: Decoding the Natural Laws of Enterprise*, 1999, 159

<sup>56</sup> “Every Soldier Is A Sensor,” Future Combat System feature, U.S. Army, [www.army.mil/fcs](http://www.army.mil/fcs), May 5, 2005

<sup>57</sup> R.D. Kaplan, *Imperial Grunts: The American Military on the Ground*, 2005, 268

<sup>58</sup> Alberts et al. 2000, 194.

“Humans create their cognitive powers by creating the environments in which they exercise those powers.”<sup>59</sup> To that effect, given Hutchins’ findings, how important are physical co-location and its implications for potential attack? Also, the Jarvis study cited in this paper established that collaboration occurred for only about a third of U.S. Navy forces in the exercise studied. Is this result consistent with the “power to the edge” vision of network centric warfare? Through which other metrics can collaboration be captured? Frictions between command and distributed network logics could also be understood by capturing not just data on topological evolution but also through work that specifically addresses the kind of problems and solutions that would emerge in a *command heterarchy*. If a substantive social domain research agenda is to be built, the goal is to use methods and theoretical frameworks that can yield a clearer picture of “how individuals happen to deal with the complex structures of relations in which they find themselves.”<sup>60</sup>

### ***About the Author***

Victor P. Corona is a doctoral student in sociology and a research associate at the Center on Organizational Innovation (COI) at Columbia University. He is supervised by Dr. David C. Stark, Arthur Lehman Professor of Sociology and International Affairs and COI Director. His research interests include organizational behavior, network theory, and military studies. His previous project examined the form and content of post-9/11 public hearings held to discuss the future of the Ground Zero site in Lower Manhattan, which draws from an ongoing COI-sponsored research effort. He received his B.A. in sociology in 2003 from Yale University and M.A. in 2006 from Columbia. His senior thesis (currently under review in article version) investigated how local elites’ mobilization of vote-delivery resources and anti-reform rhetorics contributed to the decline of technocratic networks in Mexico’s former ruling party (PRI) during the 1990s.

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<sup>59</sup> Hutchins 1996, *xvi*.

<sup>60</sup> Merton 1957, 112.