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14. ABSTRACT Our current and potential adversaries understand that they cannot fight the American military in a symmetric manner. We face at each level of war an adaptive, autonomous, highly motivated, dispersed enemy who executes in a decentralized fashion. We should expect that our conventional foes may adopt in part or as a whole this asymmetric form of warfare mixed with viable conventional capability. Distributed Operations provides the joint force and the joint force commander with the additional operational capabilities necessary to counter a decentralized foe and rapidly and decisively defeat these threats. The tempo and depth of Distributed Operations will require a change to the current joint forces command and control structure and system to match the speed and chaos that effective distributed units can bring to bear against the enemy. Command and control as we currently fight would be the Achilles heel of the Distributed Operations capability. Thus, the joint force requires an evolution of the command and control to a more cooperative balanced system. A cooperative balanced system will enable independent, but synchronized actions that achieve a faster and disproportionate effect compared to the force committed. Failure to create the necessary C2 structure that takes full advantage of Distributed Operations will severely limit, if not preclude the commander's utilization of this operational capability.					
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Command, Cooperation, and Control in Distributed Operations

by

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Abstract

COMMAND, COOPERATION, AND CONTROL FOR JOINT DISTRIBUTED OPERATIONS

Our current and potential adversaries understand that they cannot fight the American military in a symmetric manner. We face at each level of war an adaptive, autonomous, highly motivated, dispersed enemy who executes in a decentralized fashion. We should expect that our conventional foes may adopt in part or as a whole this asymmetric form of warfare mixed with viable conventional capability.

Distributed Operations provides the joint force and the joint force commander with the additional operational capabilities necessary to counter a decentralized foe and rapidly and decisively defeat these threats. The tempo and depth of Distributed Operations will require a change to the current joint forces command and control structure and system to match the speed and chaos that effective distributed units can bring to bear against the enemy. Command and control as we currently fight would be the Achilles heel of the Distributed Operations capability. Thus, the joint force requires an evolution of the command and control to a more cooperative balanced system. A cooperative balanced system will enable independent, but synchronized actions that achieve a faster and disproportionate effect compared to the force committed. Failure to create the necessary C2 structure that takes full advantage of Distributed Operations will severely limit, if not preclude the commander's utilization of this operational capability.

Table of Contents

	Page
Abstract	i.
List of Illustrations	iii.
Introduction	1.
Distributed Operations	1.
Command and Control	4.
Status Quo	11.
Command, Cooperation and Control for Distributed Operations	13.
Conclusion	18.
Appendix A. Operation Iraqi Freedom Case Study	A 1-10
Bibliography	1-4

List of Illustrations

		Page
<u>Figures.</u>		
Figure 1.	Distributed Operations Attack on COG	4
Figure 2.	OIF Linear C2 Structure	6
Figure A-1	OIF Tactical Span of Control Models	A-4
Figure A-2	OIF COC C2 Structure	A-5
<u>Maps.</u>		
Map 1.	Iraq Province Map	A-1
Map 2.	Population areas Al Qi'am AO	A-2

Our enemy has proven to be a “formidable opponent that is widely dispersed, decentralized, and whose many destructive parts are autonomous, mobile, and highly adaptive.”¹

As we engage in the current global struggle and transform the force to better fight today's and tomorrow's conflicts, one of the most challenging aspects will be the joint forces integration on the modern battlefield with emerging concepts and capabilities. Distributed Operations (DO) is a concept that can increase the operational reach and approach, tempo, speed, simultaneity, and depth of the joint force. DO will assist operational commanders in the achievement of the objectives with tailored forces over a greater breadth of the battle space.² Its operational application envisions a collapse of enemy capabilities, resources, and center of gravity faster and in a far greater proportion than the means expended.

If DO is to evolve as an operational capability for the commander to exploit, then the joint force must transform the command and control structure and function from the operational down to the tactical level. This transformation is a necessary operational, doctrinal, and cultural adaptation to the ever increasingly complex, nonlinear, and asymmetric conflicts we face today and for the foreseeable future. Failure to create the necessary C2 structure will severely limit, if not preclude the commander's utilization of this operational capability. Such a limitation could relegate this capability to a form of *Distributed Tactical Operations* vice leveraging the joint force application of the operational art under the rubicon of Distributed Operations.

*Distributed operations constitutes a form of maneuver warfare.*³

Distributed Operations. Distributed Operations is the operational application of the principal of economy of forces.⁴ Contrary to the joint definition, this application is “a balanced

¹ Hoffman, Bruce. *Insurgency and Counterinsurgency in Iraq* (Arlington, VA: RAND Corporation, June 2004), 18.

² For the purposes of this discussion “commander” will primarily refer to the joint force, land force, and the maritime component commander.

³ U.S. Marine Corps, Department of the Navy, *A Concept for Distributed Operations* (Washington, DC: Headquarters U.S. Marine Corps, 25 April 2005), I.

⁴ Joint Chiefs of Staff, *Doctrine for Joint Operations*, Joint Publication 3-0 (Washington, DC: U.S. Government Printing Office, 10 September 2001), A-1.

employment of forces and a judicious expenditure of all resources with the object of achieving effects exponentially greater at the decisive time and place.”⁵ The application of the operational art will achieve a greater proportion of the operational objectives through the maximum use of resources and capabilities of the distributed joint force. The term Distributed Operations is considered both a tactical and operational concept.⁶ The United States Marine Corps has begun experimentation and evaluation of DO focused on small units and their leaders, with the intent to employ them in a more dispersed manner across larger operational areas.⁷ In order to achieve this goal, the Marine Corps seeks to leverage the quicker decision cycle that exists at the tip of the spear at the small unit leader level. Having painstakingly nurtured a culture of initiative and trust tactics, the Marine Corps will now delegate to the lowest tactical level the ability to make decisions and influence the operational level outcome. The Marine Corps envisions training “infantry squad leaders (with) a broad understanding of command and control systems, the intelligence cycle, fire support coordination, logistics, and other (appropriate) disciplines . . . ” to execute DO.⁸ These small unit leaders would also be educated in problem-solving processes at a stage normally reserved for entry-level officers or senior staff non-commissioned officers training. Distributed operations capable units would be trained and educated to execute the full range of military operations instituting such capabilities as “every Marine a collector” and universal spotter. Next, the Marine Corps will field equipment sets to the distributed units necessary to network and communicate across the

⁵ Bernard Brodie, “The Worth of Principles of War” (Fort Leavenworth, KS: 7 March 1957), 7. Lecture delivered to the U.S. Army Command and General Staff College.

⁶ U.S. Marine Corps, Department of the Navy, *U.S. Marine Corps Concepts + Programs 2005* (Washington, DC: U.S. Government Printing Office, 2005), 43.

⁷ Sea Viking Division, MCWL, “Marine Air-Ground Task Force Distributed Operations,” *Marine Corps Gazette* (October 2004), 34; Dobson, Jr., Robert K. Col ret., “The Distributed Operations Hurdles,” *Marine Corps Gazette* (October 2004), 32.

⁸ USMC, *A Concept for Distributed Operations*, V.

joint voice and digital spectrum.⁹ Thus, the component commander's "...forward-deployed Marine Expeditionary Brigades at sea, (would be) fully capable of conducting globally networked distributed operations in all environments across the spectrum of conflict."¹⁰ In the joint battle space a properly developed DO capable land component force will execute missions, maneuver, influence battle space, engage the enemy, gather intelligence, employ fires, and sustain itself at the level normally reserved for company and battalion operations.

The employment of distributed units in the joint operations area leads to efficiently achieving the commander's operational objectives and desired end state. Distributing forces across the breadth and depth of the battle space will provide a greater means to employ operational fires and maneuver against enemy decisive points, vulnerabilities, resources, and capabilities faster than the enemy can adapt and recover. As depicted in figure 1, this wide-ranging denial and destruction by multiple units focused on a common goal would rapidly shatter an enemy's capability and will to resist. Another core operational capability of distributed units will be the ability to concentrate and disperse the force within a critical time frame and at a decisive point. Whether distributed or concentrated, a DO capable land component retains the capability to sustain and protect the force. "It allows the (joint force) commander to control tempo for sustaining continuous pressure against an opponent for as little or as long as it takes to fulfill operational aims."¹¹

DO may be suitable across the spectrum of conventional and irregular conflict based on the commander's assessment. Considering that irregular warfare has been and will

⁹ U.S. Marine Corps, Department of the Navy, *Distributed Operations 2006 Capabilities and Enhancement Report* (Quantico, VA: U.S. Marine Corps Warfighting Lab, 4 June 2002), 2-4.

¹⁰ U.S. Marine Corps, Department of the Navy, *Expeditionary Maneuver Warfare Capabilities List* (Quantico, VA: Marine Corps Combat Development Command, 15 April 2005), 24.

¹¹ Director, Force Transformation, Office of Force Transformation, Office of Secretary of Defense. *Distributed Adaptive Operations: Command & Control of Networked-enable Forces, Geographically Dispersed* (Washington, DC: 2005), 3.

The current operations in Iraq provide us ample lessons and opportunity to evaluate what still remains a conventional Cold War C2 structure and decision making process in the midst of dispersed and expanded operations. The current C2 system as organized, manned, and often centrally controlled to fight the insurgency in Iraq is not sufficient for DO. It is a linear, hierarchal, and methodical C2 structure, and far slower than the irregular enemy. The C2 structure employing DO must support a far more rapid decision cycle and tempo in order to maximize the operational reach and approach, simultaneity, and depth for the commander.

¹² Max Boot. *The Savage Wars of Peace* (New York: Basic Books, 2002), xiii-xx.

4

actions are taken.¹⁴ Command at the operational level of warfare encompasses authority but focuses on leadership.¹⁵ In maneuver warfare, this leadership uses mission style of C2 to foster initiative at the lowest level based on mission type orders, commander's intent, implicit understanding and clear communications, and a mutual trust throughout the joint force.¹⁶ The decentralized decision making nurtured by this form of C2 is critical to the commander's maximum use of the capabilities of the limited forces and resources available.

If we look at C2 as the hub of all operational functions, then C2 support systems are the mechanisms and lubricant that allow that hub to function. The harmony of command and control creates a process and a system that "monitor(s) and influence(es) the actions required to accomplish" . . . the joint force objectives.¹⁷ With C2 as a process, the commander explicitly and implicitly organizes, plans, communicates, gathers, disseminates, tasks, monitors, manages, instructs, and supervises the force and battle space. As a system, command and control uses people, information, and support structure to build a common understanding and picture of the joint battle space to execute the single battle.¹⁸ It is from this command and control process and system that the joint force applies the appropriate force in a given space and time to achieve the ends.

Span of Control. C2 is also designed to maintain the most effective span of control for the force to achieve the objective. The more units added to the commander's span of control can result in a corresponding reduction in effectiveness. The expansion of the control requirement can extend the commander and the C2 system to the point of failure. Current conventional warfare C2 operational design attempts to mitigate this overextension of span of control. A

¹⁴ Headquarters, U.S. Marine Corps, Department of the Navy, *Command and Control*, Marine Corps Doctrinal Publication 6 (Washington, DC: U.S. Government Printing Office, 4 October 1996), 6, 37.

¹⁵ Office of Chief of Naval Operations and Headquarters, U.S. Marine Corps, Department of the Navy, *Command and Control*, Naval Doctrinal Publication 6 (Washington, DC: U.S. Government Printing Office, 19 May 1995), 7.

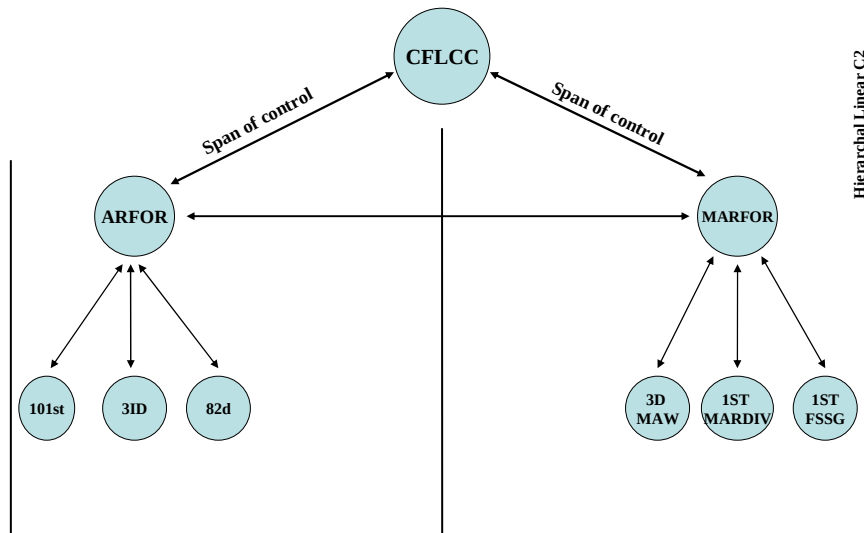
¹⁶ *Ibid.*, 52-57; U.S. Marine Corps, *Command and Control*, MCDP 6, 114-116.

¹⁷ *Ibid.*, 9.

¹⁸ U.S. Marine Corps, *Command and Control*, MCDP 6, 129-137.

commander creates command and control structures that optimize C2 systems ability to control, and thus to command. This usually results in a hierarchal system that maintains unity of effort, but increases time for information, decision cycle, and action. Operational logistics, fires, and maneuver are impacted by this hierarchal C2 system and the ability to control.

Figure 2. OIF Linear C2 Structure



The combat phase of Operation Iraqi Freedom provides a good example of the linear nature of the current joint C2 structure. When discussing C2 in this context “... linear refers to the

dynamical properties of a system rather than to linear formations or frontages on a battlefield.”¹⁹

In order for the Combined Force Land Component Commander’s (CFLCC) C2 structure to effectively support the fast pace and expansive maneuver, the operational design aimed at controlling of no more than two service components at a given point in time (See figure 2).

These components: Army Forces (ARFOR) and Marine Forces (MARFOR) span of control layout was also reflected in the battle space geometry. This C2 operational design and employment is a linear, centralized approach to command and control in non-linear maneuver warfare. Even with a near perfect understanding of commander’s intent and high levels of initiative by the maneuver units, the CFLCC’s C2 structure currently employed results in a stove

¹⁹ John F. Schmitt, Maj., “Command and (Out of) Control: The Military Implications of Complexity Theory,” *Marine Corps Gazette* (September 1998), 56.

pipelined, methodical, and detailed approach by the joint force. Such an approach is intended to impose order amongst chaos and preclude the dangers of the unexpected in a complex environment at the expense of response time and flexibility.

Unlike conventional warfare, the nature of irregular warfare directly and consistently engages the entire maneuver and support elements of the component. This all encompassing engagement of the joint force further challenges the current C2 organization, procedures, and system beyond their capacity. The C2 structure during security and stability operations and counter-insurgency must support to an even greater degree of tactical and operational tasks. A typical tactical organization must simultaneously and continuously command and control as many as 17 units involved with the economic, political, information, security, and stabilization operational issues.²⁰ Increase this by the number of major subordinate elements and commands within each component and the complexity and chaos that can exist throughout the joint operations area is evident. The result is an increase in time for the flow of critical information, events, and decisions at the operational-tactical level. The longer the C2 pipeline, the longer it takes for the commander to measure the effectiveness of the information operation, capabilities of local security forces, restoration of critical infrastructure, and so forth. Just as important is the amount of force that must be applied to achieve the operational effect due to this slow, partitioned, and methodical C2 architecture. Also, because of the sustained, asymmetric engagement of the force it has a greater propensity for fatigue and culmination. This span of control dilemma is at the heart of our C2 weakness in current asymmetric conflicts. “(T)he existing cultural and organizational approaches to C2 may actually impede the adaptive qualities need for autonomous and semi-autonomous . . . (Distributed Operations) to be successful.”²¹

²⁰ See figure A-1, Appendix A to this paper.

²¹ Director, Force Transformation. *Distributed Adaptive Operations*, 1.

Command and Control Support Systems Limitations. Maneuver warfare and counter-insurgency are dependent on decentralized decision making and execution, initiative, and unity of effort.²² The 20th Century C2 structure and support system currently fielded with the joint force, however, is incapable of fully supporting this core DO skill and the C2 mission style of leadership that it will require at all levels of the force. This C2 system is linear in nature and slants towards a hierarchal decision-maker, the commander, almost to the exclusion of the rest of the force. The system must be adjusted towards a collaborative arrangement that aims at the entire networked and distributed force.

C2 support requires reliable, secure, timely, flexible, mobile, interoperable, survivable, and sustainable systems for modern, joint combat operations.²³ The joint force C2 system requires the capability to collect, process, transmit, and disseminate data and products, monitor the execution of selected options, provide for the tracking, control, and reporting of reinforcing forces and materiel, and support reconstitution and resource allocation for multiple units simultaneously.²⁴ Current C2 support systems are capable of these requirements at the service component and joint task force level only. Intra component interoperability is reliable and flexible, but only at the operational level. This limited and linear system does not provide complete joint operational-tactical interoperability, mobility, and reliability. The resulting operational limitation is that the entire distributed force cannot perform the command, control, communication, and computer system support tasks required.

The current joint C2 support system does not effectively interact and adapt the C2 process. It also does not fully foster cooperation and support domination of the enemy through a

²² Office of Chief of Naval Operations, *Command and Control*, NDP 6, 52-57.

²³ Joint Chiefs of Staff, *Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations*, Joint Publication 6-0 (Washington, DC: U.S. Government Printing Office, 9 June 2004), II-4-5; U.S. Marine Corps, *Command and Control*, MCDP 6, 10.

²⁴ *Ibid.*, III-2.

singular system. The system inhibits the distributed unit's operational approach, reach, tempo, and simultaneity that comes from the cooperation, adaptation, and collaboration capabilities of the distributed force. Considering the tyranny of distance between units to communicate, decide, and execute supporting maneuver and fires, the current system does not support disparate management and collaboration of multiple events simultaneously at all levels of the joint force. The operational ability to apply simultaneity to overwhelm and defeat the enemy insurgent groups is significantly hampered to the point of unacceptable risk to the force. When several distributed units are decisively engaged over a broad area, collaboration is necessary to maintain leverage over the enemy. Coordination and collaboration, however, is not possible due to the limitation of communications affected by distance and basic information saturation.²⁵ This can compel a C2 process in which tactical coordination and cooperation must be executed at the operational level. The result is tactical level control devolving to the operational level command and control. Once the operational level C2 is forced to impose this additional links each situation will have to be analyzed, synthesized, and resolved in a methodical process to keep control.²⁶ This will slow the tempo and in general reduce decisive simultaneous action across the battle space against the enemy. Thus, the distance over which dispersed units can be employed, communicate, sustained, protected, and supported by joint fires is inhibited by the C2 system's ability to command, control, cooperate, and support.

This C2 support system and process weaknesses also restricts the ability "... to bring force(s) to bear on the opponent's entire structure in a near simultaneous manner that (is) within the decision cycle of the opponent."²⁷ The inability to leverage simultaneity and depth to

²⁵ See Appendix A, A7.

²⁶ Ibid., A9.

²⁷ Joint Chiefs of Staff, *Joint Doctrine and Keystone Primer* (Washington, DC: U.S. Government Printing Office 10 September 2001): A-13.

overwhelm and cripple the enemy imposes a centralized C2 process. This is counter to establishing and maintaining tempo.

Collaboration and cooperation through a robust and interoperable C2 system maintains operational tempo, in an unpredictable manner, beyond the ability of the enemy to react. The lack of a reliable and flexible command, control, and communications network, horizontally and vertically, across the joint force requires concentration and employment of larger forces at decisive points against the asymmetric threat. Again, the negative operational consequences include a larger tactical and operational footprint giving away surprise, indicating approach, and intended objectives. An even greater challenge for the joint force C2 is attacking enemy and protecting friendly decisive points. In the conduct of counter-insurgency there are far more decisive points than can be physically controlled at once. Securing decisive points at a given point in time requires a larger force due to force protection requirements. The inability of the DO joint force to self-synchronize and collaborate through current C2 system prevents the concentration of force in a timely and decisive manner and on the most favorable terms. The commander is therefore, forced to employ a larger force at decisive points. Again, the weakness of the C2 system requires the operational employment of a larger more centralized force in order to balance the operational risks.

There is a limitation as to the extent to which all of these considerations can be mitigated by adjustment of individual and unit tactics, procedures, and planning. The time factor necessary to collaborate simple information and interact over current communications processes and systems precludes a faster decision-action cycle of a distributed force.²⁸ The limitation is not the ability of these dispersed units to think and adapt to the situation at hand. The limitation is the quality of shared and individual information, the degree of interactions and collaboration,

²⁸ See Appendix A, A7-A9. of this paper for discuss on net linkage, information degradation, and time factor.

synchronization, and speed of command and control agility.²⁹ Compared to a decentralized insurgent, who is not bound to the operational conventions and can aggregate and disperse at will amongst the populace - the commander's DO capable units can be at an operational disadvantage.

The Status Quo. Several counter-points may be presented concerning the previous line of reasoning. First, are we accepting the reality of the complexity of modern conflict? Second, we are discussing human conflict, which by its very nature is chaotic and cannot be controlled. Complexity by itself requires that we organize a system of systems that is simple, manageable, and effective. This complexity in the midst of chaos also prescribes an organizational model that supports the commander's focus on the enemy and the objective. Current joint force command and control processes furnish the commander with the ability to control a complex operational employment of forces in order to diminish the chaos. This control is effective across the range of military operations. Through this control, the commander's assessment identifies the proper means to achieve the desired end state. Changing these proven C2 methods will create more chaos and confusion and potentially cost more to accomplish the task.

Third, it may be argued that the joint force fights better along service component lines. This organizational structure is designed to maximize the unique capabilities of each service. The joint C2 system at the component level is reliable, secure, flexible, interoperable, survivable, and sustainable. Instead, what we must do is ensure that the C2 leadership style and system supports the component commanders' cooperation and collaboration with a common understanding and mutual trust. These capabilities foster the decentralized execution of the entire force based on the joint forces commanders' intent - the best application of maneuver

²⁹ Director, Force Transformation, Office of Force Transformation, Officer of the Secretary of Defense. *Network Centric Operations Case Study: The Stryker Brigade Combat Team* (Arlington, VA: Rand National Defense Research Institute, 2005), 53.

warfare within the component C2 framework. Fourth, with proper planning of the command and control function we can fully leverage DO for the joint force. As major operations are planned and executed, proven joint tactics, techniques, and procedures will take advantage of a distributed force's capabilities. The organization of decision points and the appropriate application of a distributed force will not overwhelm the C2 system. Although this will be a challenge for fires and intelligence, the joint targeting process, apportionment, allocation, and prioritization will include the employment of distributed forces. This will reduce potential confusion and delay of support. The current system allows for the flow of intelligence and appropriate filter of information to the force. This information flow for a distributed unit is best supported by the component C2 system. A component has a better understanding of its battle space and operation capabilities.

The current C2 system is also responsive enough to support parallel planning during ongoing combat operations. This provides sufficient information and time for the DO unit to plan and execute multiple tasks. Finally, despite the continuing study and discussion of network centric warfare the problem is quite simple. The entire joint force does not have the capability to employ a tactical to operational level networked system necessary to redesign our current C2 organization, system, and process. Any attempt to push down to distributed units the current joint systems would be too much of a burden on the force. This burden could be so heavy that the force is ineffective at de-aggregating and lacks the mobility to effectively concentrate in a timely manner. All of this would have a negative effect on the operational reach and speed of DO units. This could lead to a culmination of DO units similar to the drawbacks of today's logistically light special operation forces.

“ . . . (A)ny military action, by its very nature (is) a complex system . . . A complex system is any system composed of multiple parts, each of which act individually according to its own circumstances and which, by so acting, changes the circumstances affecting all of the other parts.”³⁰

Distributed Operations Command, Cooperation and Control (C3). Our current process and system must be changed from command and control to a true *Command, Cooperation, and Control* (C3) system. The employment of the DO concept in a joint environment will demonstrate a level of complexity that requires an operational process and system capable of adapting to intricate interaction. The chaos of the battlefield is the reason why command and control is so challenging. We cannot control chaos, but we also cannot remain slaved to a linear system because of it. The clash of the enemy’s action and will with friendly forces’ objectives and intent within an environment influenced by political and cultural constraints spawns an increasingly chaotic environment. This is a fundamental advantage of DO in any setting – flourishing in the complexity and chaos with an asymmetric advantage against our foes. It is within this complex and chaotic environment that the span of distributed operational control will be forced to a more cooperative balanced system. In order to support the deeper operational reach and extensive dispersion that DO entails, the C3 systems should not only support the commander, but enhance the situational awareness, information sharing, understanding, integration, collaboration, decisions, and execution of the entire joint force. In order to have a valid operational capability, the lowest level of the joint force must have not only access, but unfettered input of information, support, and decision making from and into the process and system.

Distributed Operations Command, Cooperation, and Control Transformation. The operational application of DO requires an evolution to a cooperatively balanced process and system. It is through cooperation, and armed with commander’s intent and guidance, that

³⁰ U.S. Marine Corps, *Command and Control*, MCDP 6, 44-45.

distributed units can work within the complexity and use the battle space chaos to their advantage. Cooperation should not be viewed merely as a component of control.³¹ Here the process must concentrate on the ability of DO units to “. . . work together laterally and from the bottom up to accomplish tasks that fulfill the commander’s intent.”³² It is through this independent but synchronized cooperation guided by the commander’s intent and dominated by initiative and decentralized decision making that the level of control of distributed forces is enhanced. The control that we seek is not absolute and must be visualized along a scale. The level of control that a cooperative balanced approach to command and control should seek is enough to maximize the asymmetric capabilities of the distributed force above that of the enemy. Such a command, cooperation, and control process and system will generate the appropriate level of self control through awareness and cooperation. We will find that the increase in the ability of the joint commander to conduct operational maneuver enabled by DO makes a far greater cooperative method a necessity for the appropriate level of distributed control.

How does the commander achieve C3 balance as an operational and warfighting capability? First, we must be willing to move away from the traditional stovepipe service component C2 model. The delay in the layered hierarchal structure is unnecessary and the antithesis for joint DO. The component C3 can be a flatter more responsive and transparent system. Here the service capabilities must be one seamless joint force from the tactical to operational level. Land, air, sea, and special forces with unfettered access and collaboration through the joint C2 structure support multi-service DO tactical actions to accomplish operational tasks.

³¹ Headquarters, U.S. Marine Corps, Department of the Navy, *Tactics*, Marine Corps Doctrinal Publication 1-3 (Washington, DC: U.S. Government Printing Office July 30, 1997), 92.

³² *Ibid.*, 93.

Second, the goals of this redesigned process should seek, at every level, to expand the individual and organizational decision space. A review of the appropriate planning and decision process for DO is in order. Multi-level collaborative planning is an essential tool for rapid decision making and decisive action during DO and irregular warfare. Parallel planning and the 1/3 to 2/3 rule is sequential and takes away time, tempo, and speed in DO. During counter-insurgency, these operational facets are critical to protect the force, execute decisive action against the enemy and in support of the population, to achieve the military and political objectives. Here, the planning process must be made collaborative from the commander down to the platoon level. This will provide the time to make decisions and more importantly, bottom up input to analyze and solve the problem while remaining distributed.

Third, a new concept of Command, Cooperation, Control, Computer, and Communications (C5) system will be necessary to provide the maximum command, cooperation, and control capability for DO. This new system must evaluate the manning and organization of people to command and control DO units. A change to the manning structure of the tactical and operational units (company to corps) to be able to simultaneously complete multiple operational-tactical tasks at several echelons in a joint expeditionary environment is essential.³³ This change would consist of a more robust tactical level intelligence, logistics, and fires cells and staff with the capability and capacity to manage simultaneous engagements of multiple distributed units continuously without culmination of the C3 support structure.³⁴ This transformation must provide a real time tactical to operational linkage and visibility of the operational conditions and effects for the commander.

Fourth, another key step will be the development and fielding of a reliable, interoperable, and mobile joint Battle Command and Operating Systems and Network (BCOSN). This system

³³ See Appendix A, A4.

³⁴ Ibid., A2.

must provide the capacity to information share, fuse, integrate joint fires, analyze intelligence and disseminate it, and real time multi-echelon collaborative planning at all levels of the force. The capability can fuse current battle command systems such as: Advanced Field Artillery Tactical Data System (fires); Combat Service Support Control Systems (logistics); Integrated Meteorological System (weather); System Planning Engineering and Evaluation Device (communications); Tactical Air Information System (aviation); Intelligence Analysis System (intelligence); and Joint Universal Mission Planning System, Force XXI Battle Command: Brigade and Below System, and Defense Collaborative Tool Suite (planning and maneuver). The capability to link these already existing joint operating systems networked throughout the battle space, from the squad leader to the joint force commander level will expand the joint forces' vertical and horizontal communications threads and provide an indispensable joint common operation picture (COP) necessary for DO to collaborate, cooperate, self-synchronize, and control. To support the integration of these operating systems that feed the COP, a secure, flexible, and sustainable communications network must be established from the tactical to joint operational level. BCOSN will create an interoperable capability at all levels of the force for planning and execution in the joint environment. The linkage and visibility of land, air, maritime, and SOF components will allow the distributed force to have increased operational impact across the joint operations area. All of these capabilities are currently in the field, but the capacity to achieve this is the joint force's true limitation. The joint force must have the capacity to move beyond the traditional confines with vision and boldness to implement the significant changes to an operational function.

Fifth, we must accelerate the progression of maneuver warfare philosophy and practices in all facets and at all levels of the joint force. All joint concepts and doctrine advocate the philosophy of risk taking, uncertainty, chaos, initiative, boldness, trust, and numerous other

characteristics paramount for maneuver warfare. Our actual inclusion of these key characteristics for DO, however, does not permeate all facets of our training, organization, equipment, and subsequent warfighting execution. Centralization, certainty oriented, stove pipe perspective, and zero defects still remain embedded in our service cultures, command relationships, task organizations, and training. In actuality, we practice maneuver warfare to the level that we are comfortable and no farther. We must learn to accept uncomfortability and seek even more complex and chaotic joint training environments and situations that DO can thrive in.

Finally, we must develop an organizational mindset that is not afraid to train to failure and that goes beyond the generic training requirement to a higher standard of teaching and learning. This training must quickly accept change, innovation, and the unexpected. If this is the nature of conflict and the way the enemy fights, then it should be the way we train to fight. The measures of performance for the DO C3 must be an effective communications of task and purpose in an atmosphere that advocates all of the maneuver warfare characteristics from the lead squad leader to the joint force commander to accomplish the objective.

Conclusion. Command, cooperation, and control organizes, plans, and coordinates the execution of intelligence, logistics, fires, civil affairs, and other operational functions necessary for DO units to accomplish the mission. Until we advance the operational command and control and push it down to the tactical level for networked situational awareness and joint interoperability we will be executing Distributed Tactics, not Distributed Operations. The current C2 structure and support systems are below the ability to support the commander's command and control mission style of leadership in DO. Again, this system must be changed from command and control to a true *Command, Cooperation, and Control* system. This is not merely a shift in words, but a progression of our methodology and thought process for this necessary transformation. There have been many recommendations to change this age old

operational function: adaptive C2; command and integrated control, command or control, command and cooperation, to name a few. It appears that the joint force has the resources and capabilities to flesh out the operational means for execution of DO. The challenge in making DO a bona fide 21st Century operational capability in the joint force commander's tool kit, with a heightened deployment tempo, competing budgetary interests, and cultural perspectives will need to be overcome.

Distributed Operations Case Study during Operation Iraqi Freedom³⁵ From March to September 2004, Third Battalion, Seventh Marines executed a stabilization and security operations on the western Iraqi-Syrian border of Al Anbar Province, Iraq. The battalion's area of operations (AO) encompassed 1000 square kilometers (km). This AO included two major



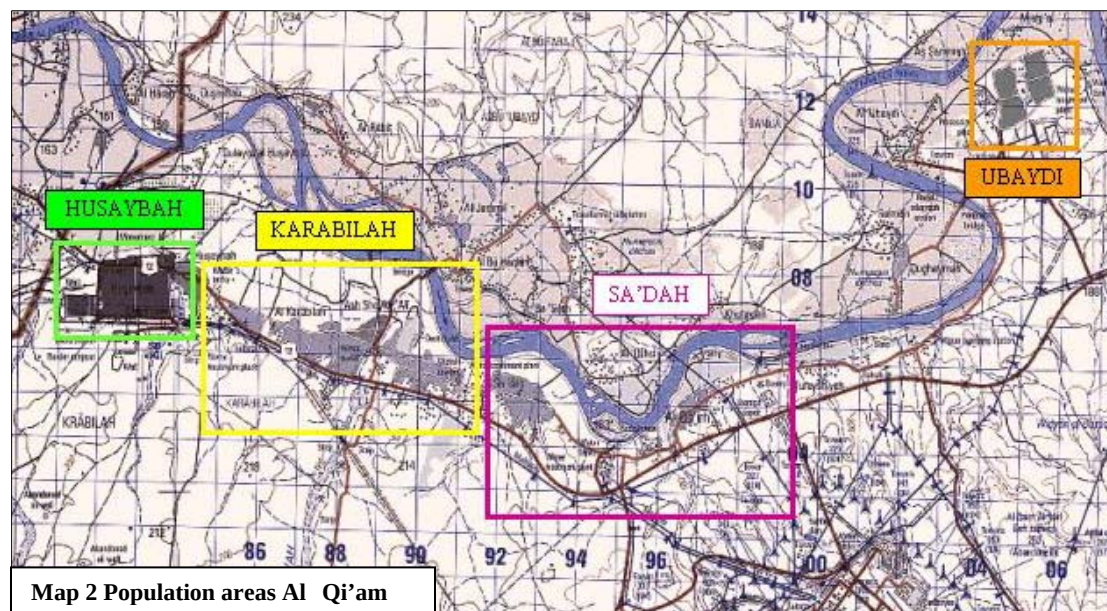
supply routes (MSR) – one traveling east to west from Ar Ramadi to the border port of entry (POE) and another north to south to the Jordanian POE. To the far west of the AO the Iraqi-Syrian POE was located in the city of Husaybah. Ten km east of Husaybah POE was the towns of Karabilah and Sadah and another twenty km to the town of Ubaydi. The distance from the battalion forward operating base (FOB) to the

company base was 35 km. The battalion's FOB was centrally located in the AO at an abandoned railroad facility. The AO was organized into four company zones. Daily insurgent activity throughout the AO covered the spectrum of irregular warfare in Iraq. Mortar and rocket attacks, squad and platoon size enemy direct fire ambushes, numerous improvised explosive devices

³⁵ This document is a brief case study of the tactical and operational actions of a Marine infantry battalion in Iraq. The intent of this study is illustrate some of the command and control considerations during Distributed Operations.

(IED), assassination of coalition supporters, political leaders and security forces, destruction of government property, and information “terror” operations were the methods used by the enemy.

Company Distributed Tactical Operations. One reinforced rifle company as the battalion main effort was assigned zone west including the Husaybah POE. The city of Husaybah with a population of 100,000 was a decisive point in the battalion AO. The company staff was



augment
ed with
intellige
nce,
logistics,
commun
ications,
and
operatio

ns personnel and equipment. The intelligence detachment conducted: collection; detainee screening and questioning processing; limited analysis; and intelligence briefings and dissemination. The logistics detachment provided: vehicle and equipment maintenance; classes of supply and sustainment; level one medical care; contracting; and logistic reporting requirements to the battalion. The communications augments established and maintained: vertical and horizontal UHF, VHF, and satellite radio communications capability; Blue Force Tracker (BFT) using Force Brigade Combat Battle System (FBCB2) network connection; and maintained civilian purchased NIPRE net connectivity. The operations sections assigned a full Tactical Air Control Party with a Forward Air Controller to the company. Due to the

autonomous nature of its position and mission the company managed a 24 hour watch rotation for the intelligence, logistics, and operations sections. This C2 organization planned, directed, coordinated, and controlled the company's critical SASO mission.

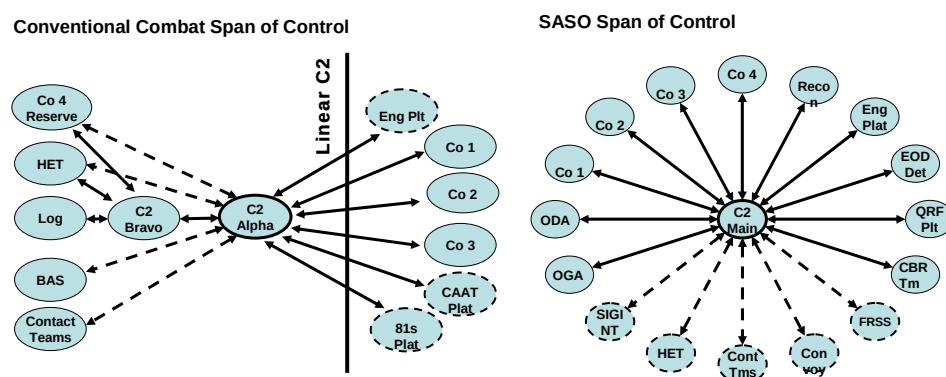
The company's combat power consisted of: five to six rifle platoons; a three section combined anti-armor (CAAT) platoon; 81 mortar section; engineer squad; scout/sniper platoon and force reconnaissance platoon. The CAAT Platoon was a reinforced and task organized 12 vehicle unit with 18-24 machine gunners and mortar men in each four vehicle section. This allowed two 81mm mortar tubes to be manned at all times by a section in the company base. As the insurgent's tempo increased the company's combat power would later be increased to a section of AAVs, a section of M1A1 tanks, and a D9 combat bulldozer. The company's personnel numbers often exceeded 350 personnel for sustained SASO and combat operations. Rotary wing platforms (AH-1 Cobras) would provide close air support (CAS) via preplanned or immediate air support request. Dragoneye unmanned aerial vehicles (UAVs) controlled by the company COC were also employed in coordination with the patrol cycles.³⁶ Sniper and reconnaissance teams in observation posts (OP) observed areas of interest and supported communications relay for the maneuvering units. The distance between the zones dictated semi-autonomous company operations. This elementary form of distributed operations was applied throughout the 3/7 AO and covered the breadth of irregular warfare.

Battalion Operational Command and Control. In order for the battalion commander to conduct mission command and control of his dispersed units over a wide, deep, and asymmetric battlefield the battalion C2 organization and support structure required detailed modification. Based upon the battalion's OIF I SASO experience, this meant an adaptation in

³⁶ Dragon Eye is a tactical level unmanned aerial vehicle. 3/7 received seven Dragon Eye UAVs in June 2004. Company L employed three Dragoneyes.

the training, procedures, equipment, technology, and organization. Where the battalion's continuous span of control during conventional combat operations was normally three to four units. As depicted in figure A-1, SASO expanded this span of control requirement to as many as seventeen. This stretched the span of control beyond the ability of the command group to sustain effective twenty-four hours, seven days a week operations.

Figure A-1. OIF Tactical Span of Control Models

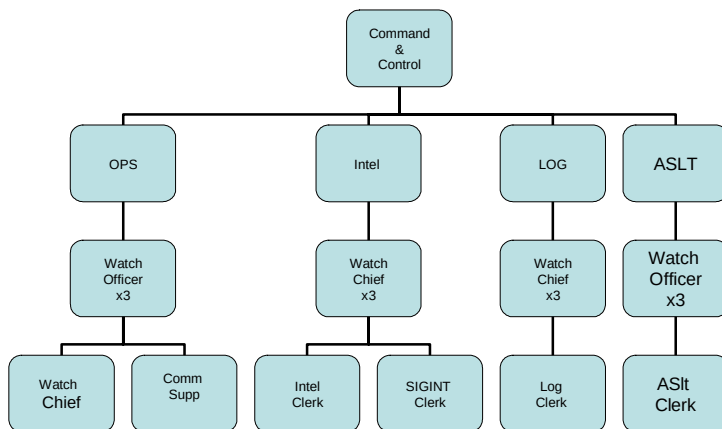


Organization. Several sections required significant augmentation beyond the standard task organizational manning in order to manage the volumes of information and tasks that generate in SASO compared to conventional operations. The disparity in the organization of C2 section illustrates the problem. Per the table of organization, the operations and logistics section consisted of thirteen and seven personnel respectively, compared to the intelligence section which consisted of four personnel. Based upon this manning, the intelligence section could not maintain the same tempo as operations and logistics. Attached to the battalion for the SASO mission were several organizations not traditionally task organized nor trained with. The battalion received a Civil Affairs Group (CAG) Detachment, Air Support Liaison Team (Aslt),

Human Exploitation Teams (HET), Psychological Operations (PsyOps) Team, and Signal Intelligence Teams (SIGINT). Each attachment functioned under Intelligence or Operations sections in the COC.

The solution to this command and control manning deficiency was augmentation of the battalion staff by First Marine Division and I Marine Expeditionary Force. The C2 reorganization as depicted in figure A-2, resolved significant staff tempo problems for the battalion. This robust rotating staff supported the ability to provide fresh but situationally aware minds to evaluate the nature of the problem, identify critical enemy and friendly vulnerabilities, and focus the battalion efforts. Tired overworked staffs miss critical pieces in SASO that often have nothing to more do with kinetics and a lot to do with people and beliefs. The modified SASO staff filtered, fused, and prioritized information and events with drastically improved

Figure A-2 OIF II COC Structure



efficiency compared to the standard table of organization.

Procedures. Procedures were improved to receive reports, coordinate and task and respond to higher via these organizations.

The amount of information received and disseminated and

civil, security, political, and financial issue dealt with on a daily basis is staggering. The Intelligence Section supported by HET, SIGINT, and SOF also received an overwhelming volume of information to analyze, fuse, and disseminate.

Traditional applicable reporting formats were reviewed, standardized, trained, and strictly adhered to. Nontraditional formats, such as the electricity and sewage and other CA reports briefed were made clear, simple, and consistent to the fullest extent possible. Information exchange standards were improved in order to increase C2 effectiveness. Procedures were integrated by the staff into the battle rhythm and helped to manage volumes of information. Various data systems were procured and developed internally to support planning and the operational picture. These adhoc systems allowed for retention, recall, and research of information in the COC.

Equipment Technology. Command, control, communications, and computer (C4) systems were the most challenging for the battalion to field, train with, integrate into the C2 system, and maintain. The C4 capability of an infantry battalion is not interoperable, flexible, responsive, mobile, and sustainable. For example, by table of equipment of the sixty-three computers that an infantry battalion rates only four are dedicated secret computers. All operational functions, with the exception of supply and maintenance management are conducted in Iraq via secret internet connectivity. All logistic support functions required non-classified internet capability. An infantry battalion rates two tactical routers and server, but doesn't rate secret capable tactical telephones and switchboards. Again based upon the OIF I experience the battalion's Communications Platoon understood the significant network and C4 support limitations of an infantry battalion during SASO. In order to provide a sufficient C4 support system, adhoc and homegrown network capability was purchased and built by the battalion. Adequate secret capable digital connectivity was never established with the distant companies.

Lessons. The ability to gain a decisive operational advantage against the insurgents at the tactical level in the irregular environment was extremely difficult. The battalion's speed,

approach, and tempo against an asymmetric enemy in the midst of the population was always limited by the flow and fusion of information. The extended time to gain situational understanding adequate to take decisive action against the enemy usually resulted in the enemy evading a tactical response. As incomplete information flowed from single or multiple points, the time necessary for cognitive recognition of the situation and the solution allowed a fleeting enemy to maintain the initiative. The ability of distributed squads and platoons to reliably collaborate beyond the immediate engagement area was not within the capability of the tactical leader. The current tactical unit communications supports internal survivability and coordination. The ability to access a broader reach of forces still had to go through a layered and often adhoc communications system. Again, time was the enemy of this process as the target vehicle often raced from the engagement area far faster than the force could identify and maneuver against.

Low power communications restricts units over distant or in built-up terrain. This limited capability and reliability imposed a concentration of the force, often at a time and place not of our choosing. The enemy's use of IEDs required swift, dispersed, indirect movements over a short duration. This would minimize enemy opportunity to orient on a concentrated force and engage with multiple pre-laid IED kill sacks.

The limitation in the C2 system was affected by the reliance on a single high powered voice command net. The large AO necessitated high powered communications capability for dispersed units. It often required the same for mutually supporting units in dense urban terrain. Such mobile capability currently rests only with tactical vehicles. Despite modifications to the Battalion COC and Company CPs for bench mounted high power communications this did not solve the problem below the company level for a dismounted unit and some mounted units.

Even with the optimum high power communications plan, the battalion was still subject to significant degradation in the quality of individual communications. These degradations occurred from several factors: time required to relay information through multiple units, filtering, and receipt failure through the chain, misinterpretation, and delay.³⁷ Time on voice command net was dominated with gaining basic information. Such basic information as: what unit is it; what is their location; what is the friendly situation; enemy situation, etc. was subject to significant degradation of clarity and correctness as it passes through multiple communications links. Other than human procedures with manual input these basic voice net information was and still is not subject to automated system retention and recall by the force.

The small unit leader in a dispersed and/or urban topography must relay his information through several human links. Typically, a dispersed platoon would position its forces throughout the urban battle space in order to relay from low powered single channel communications equipment to high-powered systems. The high powered systems in vehicles or at the company CP would receive the information for further relay. Thus, a report from a squad leader could move through four to five links before reaching the C2 node. Once at the high power capable node again the common situational awareness was provided via the same single voice net to monitoring and potentially supporting units. The degradation to these monitoring units was due to the same factors previously discussed. Communications of this basic information, if accurate, increased the time necessary for the commander and the force as a whole to ascertain what was happening, decide, and act upon the situation. This would often preclude the speed necessary for multiple units to cooperate in the maneuver and destruction of the enemy.

Another C2 system limitation was the employment of immature digital communications systems and lack of training thereof in the Marine infantry battalions. As previously discussed

³⁷ Director, Force Transformation. *Network Centric Operations Case Study*, 67.

EPLRS, MDACT, and BFT was the primary automated tactical digital system. Due to a lack of bandwidth, fielding of equipment, and training the EPLR/MDACT digital communications network could not be properly maintained to a battalion digital COP. The result was that the systems were regulated to primarily PLI only vice digital communications.

The tyranny of distance between units to communicate, decide and execute supporting maneuver was significantly hampered when more than one unit was in contact. With four units simultaneously engaged throughout the AO the operational ability to apply simultaneity to overwhelm and defeat the enemy insurgent groups were extremely difficult to the point of unacceptable risk to the force. The system did not support disparate management and collaboration of multiple events simultaneously. When several units from two or three distributed companies were decisively engaged over a dispersed area beyond their ability to communicate and support each other, the battalion (since it had the communications power) had to coordinate the tactical collaboration necessary to regain leverage against the enemy. This went beyond simple allocation of resources such as aviation fires and the reserve. Coordination and collaboration normally associated with subordinate adjacent units was not possible due to the limitation of voice net communications affected by distance and basic information saturation. This often forced a C2 process in which small unit tactical coordination and cooperation devolved to the battalion C2 control. Once the battalion was forced to impose this additional links this slowed the tempo and in general reduced decisive simultaneous action across the battle space against the enemy.

The capacity of multiple units to effectively gain situational awareness and collaborate their actions in different engagements was another problem for the battalion. Multiple dispersed enemy engagements could number as high as seven and would overextend the span of control

capability. The battalion C2 was then forced to “go firm” with multiple units in order to prevent engagements that would overwhelm the C2 structure while it focused on a single situation that it deemed the priority.³⁸ Each situation would then be analyzed, synthesized, and resolved in a methodical process to keep control. This detailed command and control became essential to minimize casualties (from enemy or friendly action) and apportion limited resources in the most effective manner across such a wide battle space. Concurrent engagements against all of the enemy’s capabilities and sources of strength were extremely difficult for the company to manage with several dispersed squads and platoons in the urban environment. The same was true for the battalion employing several dispersed platoons and companies throughout the battalion space. The operational ability apply simultaneity and depth required a centralized C2 process.

The overall limiting factor was not the decision-making of the combat experienced small unit leaders. At the tactical level the Marine and the unit could defend themselves against relative enemy combat power. However, they could not coordinate and decisively act in and of themselves and in a mutual effort to accomplish the operational objective – destruction of insurgent groups.

³⁸ U.S. Marine Corps, *Project Metropolis Basic Urban Skills Training Handbook* (Quantico, VA: Marine Corps Warfighting Lab, June 2002), 20-21.

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