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INSTITUTE FOR DEFENSE ANALYSES

Assessing the Adequacy of Coverage of Joint Command and Control in the Capstone Concept for Joint Operations

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Waldo D. Freeman
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PREFACE

This paper was prepared under the task order Joint Advanced Warfighting Program (JAWP) for the Joint Staff Directorate for Operational Plans and Joint Force Development (J7), Joint Experimentation, Transformation and Concepts Division. It was informed by work done at the Institute for Defense analyses (IDA) for other sponsors.

The JAWP was established at IDA to serve as a catalyst for stimulating innovation and breakthrough change. It is co-sponsored by the Under Secretary of Defense for Acquisition, Technology, and Logistics; the Under Secretary of Defense for Policy; the Vice Chairman of the Joint Chiefs of Staff; and the Commander, United States Joint Forces Command (JFCOM). The JAWP includes military personnel on joint assignments from each Service as well as civilian specialists from IDA. The JAWP is located in Alexandria, Virginia, and it also has an office in Norfolk, Virginia, to facilitate coordination with JFCOM.

This paper does not necessarily reflect the views of IDA or the sponsors of JAWP. Its intent is to stimulate ideas and discussion and, ultimately, to help accelerate the change processes of the Department of Defense.

The authors thank members of JFCOM J8 and J9 staff for dialogue and feedback on an outline briefing of our findings and recommendations and Peter Kind, John Hanley, and Mason Brooks for their thoughtful and thorough review of this version of the paper. Their comments and suggestions were very helpful and were incorporated into the paper to the degree possible. The authors, however, remain solely responsible for the content and any possible errors.

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EXECUTIVE SUMMARY

The Joint Staff, J7 Joint Experimentation, Transformation, and Concepts Division asked the Institute for Defense Analyses (IDA) Joint Advanced Warfighting Program (JAWP) to evaluate how adequately the Capstone Concept for Joint Operations (CCJO) covers joint command and control (JC2). The CCJO “heads the family of joint operations concepts (JOpsC) that describe how joint forces are expected to operate across the range of military operations in 2012–2025. Its purpose is to lead force development and employment primarily by providing a broad description of how the future joint force will operate.

The IDA study team first evaluated the CCJO itself relative to JC2. The team then reviewed current doctrine, operations, planning, and activities with JC2 content—the Universal Joint Task List (UJTL), Multi-Service Force Deployment (MSFD) Scenarios, wargames, and experiments—for possible insight that might inform the next revision of the CCJO. These sources proved generally unhelpful.

The study team then examined advanced theoretical work, especially the OSD Command and Control Research Program (CCRP), for insight. This proved very useful and provided a theoretical framework of possible future JC2. Next the team reviewed concepts subordinate to the CCJO that have JC2 content, particularly the C2 functional and integrating concepts. Both were consistent with the CCRP framework and conceptually ahead of the CCJO. Finally, the team examined selected Defense Advanced Research Projects Agency C2 work and activities at JFCOM. Both reinforced the correctness of the direction reflected in the CCRP and the subordinate JC2 concepts.

In answering four specific sponsor-directed questions related to doctrinal command structures, capability gaps, treatment of C2 in the CCJO, and subordinate C2 concepts, the study team reached four conclusions indicating that greater clarity regarding future JC2 is needed in the CCJO.

Our short answer to whether doctrinal joint command structures are adequate to execute the CCJO is “no.” The doctrine is inadequate, but that should be no surprise since it is by definition a description of how current forces should operate, not how future

forces might operate. Moreover, the issue is much broader than joint command structures alone since, as the CCRP work clarifies, they are only one of many components of JC2.

Regarding command and control capability gaps, we conclude that significant JC2 gaps exist but the CCJO alone does little to illuminate those gaps or required capabilities. However, the desired new C2 options (concepts), the required new capabilities, and the resulting gaps are documented in several subordinate concepts, but one cannot make a strong case linking them specifically to the CCJO.

We have determined that the CCJO does not clearly and adequately address future JC2. This is primarily because the CCJO never mentions JC2 directly in the body of the paper although the clear need for advanced C2 concepts is implied throughout it. In fact, we infer that the CCJO is more about JC2 than anything else without acknowledging it.

Finally, we conclude that the Joint Command and Control Functional Concept and the Command and Control Joint Integrating Concept are consistent with but conceptually ahead of the CCJO. From the consistency standpoint, both documents support the CCJO three fundamental joint actions concepts. But the linkage between them is tenuous due to the aforementioned lack of clarity about JC2 in the CCJO. As a result, other less transformational but also still consistent functional concept and integration concept documents might also be seen as satisfying the murky JC2 ideas in the CCJO.

The team recommended specific JC2 language that might be inserted into the CCJO and offered three alternative approaches for doing so. Appendix A includes suggested specific line-by-line revisions to the document for each alternative.

I. BASIS FOR THE STUDY

A. INTRODUCTION

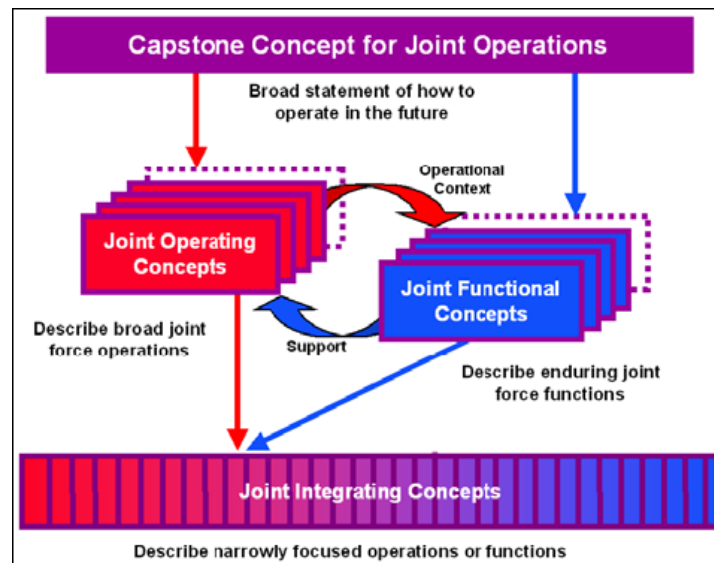
The Joint Staff, J7 Joint Experimentation, Transformation, and Concepts Division asked IDA/JAWP to evaluate the *Capstone Concept for Joint Operations* (CCJO) from the standpoint of joint command and control (JC2).¹ The CCJO “heads the family of joint operations concepts (JOpsC) that describe how joint forces are expected to operate across the range of military operations in 2012–2025. Its purpose is to lead force development and employment primarily by providing a broad description of how the future joint force will operate. Service concepts and subordinate joint concepts will expand on the CCJO solution. Experimentation will test the concepts and offer recommendations for improvements across doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) and policy.”²

“As the head of the [JOpsC] family, the CCJO guides the following: joint operating concepts which address military problems associated with broad joint force operations (e.g., major combat and stability operations); joint functional concepts, which address broad enduring functions across the range of military operations (e.g., force application and battlespace awareness); and joint integrating concepts, which address specific military problems associated with narrowly scoped operations or functions [e.g., global strike and joint logistics (distribution)]. In all cases, subordinate concepts within the JOpsC family are compatible with and supportive of the CCJO.”³ Figure 1 shows the relationships within and among the concepts family.

¹ In the course of this study, we discovered a subtle difference between *joint C2* and *C2 for joint warfighting*. *Joint C2* is defined in the Joint Command and Control Functional Concept as “C2 exercised by a combatant commander, subunified commander, or joint task force commander.” Contrast this with the broader C2 military problem identified in the Command and Control Joint Integrating Concept as the ability of commanders to exercise effective C2 of an interdependent joint force. As this study matured, our thinking about C2 broadened from the relatively narrow definition of *joint C2* to the more encompassing definition of *C2 for joint warfighting*. Our use of the term JC2 in this paper reflects this broadening and is intended to mean command and control of an interdependent joint force.

² CCJO v2.0 August 2005, Executive Summary, p. vii.

³ Ibid., p. 3.



Source: CCJO v2.0, p.3.

Figure 1. JOpsC Family

“The CCJO provides broad guidance to Service concepts and other joint concepts outside of the JOpsC family. Those concepts must be compatible with and supportive of the CCJO.”⁴ Thus it is clear that the CCJO is a very important document with major implications for future forces and their ways of operating.

Additionally, Joint Publication 0-2, *Unified Action Armed Forces (UNAAF)* asserts without qualification that “JC2 ... is the most important function undertaken by a JFC.”⁵ Therefore, how JC2 is discussed in the CCJO also is extremely important. The Joint Experimentation Transformation and Concepts Division (JETCD) recognized this fact and wanted to either confirm the existing treatment of JC2 in the CCJO or get solid ideas for improving it. The JETCD asked IDA/JAWP to take on this challenge.

1. Task description

The initial task included in the JAWP 2006 annual work plan in support of the JETCD initiative read as follows:

Joint Command Structure (JS J7). Prepare a briefing and paper analyzing the following: 1) Are doctrinal joint command and control structures (JTF and domain components - JFLCC, JFACC, JFMCC, JSOTF) and relationships (supporting/supported,

⁴ Ibid.

⁵ JP 0-2, *Unified Action Armed Forces (UNAAF)*, p. III-13.

OPCON, TACON, COCOM and ADCON) adequate to “execute the Capstone Concept for Joint Operations? 2) Are functional components (logistical, intelligence, information operations) needed to support CCJO? 3) Are joint headquarters needed below JTF for specific missions?”⁶

This task as originally written focused on three kinds of JC2 structures with an emphasis on doctrine. The language was subsequently simplified to read “are doctrinal joint command structures adequate to execute the *Capstone Concept for Joint Operations*?”⁷

Upon further research and reflection the study team recommended again changing the task description to broaden its focus. This was because examination of “traditional” (or “standard”) command structures and current doctrine alone, given the emphasis in DoD on Net-Centric Operations, may lead to incomplete or erroneous conclusions about what is appropriate for future concepts. As a result, a revised approach to the task was again coordinated with and approved by the sponsor.⁸ It incorporates the original questions but adds breadth to the task. The second revision asks the IDA team to address the following broader set of issues:

- Are doctrinal joint command structures adequate to execute the Capstone Concept for Joint Operations (CCJO)? Why or why not?
- If not, what C2 options exist or what new C2 capabilities are required to close any gaps and to achieve the C2 requirements expressed in the CCJO?
- Determine whether the CCJO clearly and adequately describes (or implies) the JC2 dimension of how joint forces are expected to operate across the range of military operations (range of military operations) in 2013–2026.
- Additionally, determine how consistent the Joint C2 Functional Concept (JC2 FC) and the C2 Joint Integrating Concept (C2 JIC) are with the CCJO.

2. Basic Definitions of Command and Control

Based on the revised task description the study team developed a methodology to answer the questions. It started with a review of basic definitions, which turned out to be more complicated than expected. The team then completed a careful scrutiny of the

⁶ Copy of original task description provided by Robert Worley, formerly of JAWP, who was initially assigned to it.

⁷ Refined through collaboration with the sponsor in April 2006.

⁸ Again refined through collaboration with the sponsor in August 2006.

CCJO followed by a broad survey of thinking about current and future C2 in general and its various dimensions. First we lay out the basic definitions.

Definitions are important and in the case of command and control they are not well understood or necessarily clear. The key DOD definitions in complete form follow:

Command: 1) The authority that a commander in the Armed Forces lawfully exercises over subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources and for planning the employment of, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions. It also includes responsibility for health, welfare, morale, and discipline of assigned personnel. 2) An order given by a commander; that is, the will of the commander expressed for the purpose of bringing about a particular action. 3) A unit or units, an organization, or an area under the command of one individual. Also called CMD. See also area command; base command; combatant command; combatant command (command authority).⁹

Control: 1) Authority that may be less than full command exercised by a commander over part of the activities of subordinate or other organizations. 2) In mapping, charting, and photogrammetry, a collective term for a system of marks or objects on the Earth or on a map or a photograph, whose positions or elevations (or both) have been or will be determined. 3) Physical or psychological pressures exerted with the intent to assure that an agent or group will respond as directed. 4) An indicator governing the distribution and use of documents, information, or material. Such indicators are the subject of intelligence community agreement and are specifically defined in appropriate regulations. See also administrative control; operational control; tactical control.¹⁰

Note that both terms have multiple possible meanings when separated. Meanings 1 and 2 under “command” and both 3 and 4 under “control” are the uses that seem to apply when the terms are combined into C2 as follows:

Command and control: The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures

⁹ <http://www.dtic.mil/doctrine/jel/doddict/data/c/01087.html>.

¹⁰ <http://www.dtic.mil/doctrine/jel/doddict/data/c/01262.html>.

employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called C2.¹¹

Command and control system: The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned and attached forces pursuant to the missions assigned.¹²

NATO has its own definition for command and control:

The functions of commanders, staffs, and other command and control bodies in maintaining the combat readiness of their forces, preparing operations and directing troops in the performance of their tasks. The concept embraces the continuous acquisition, fusion, review, representation, analysis and assessment of information on the situation; issuing the commander's plan; tasking of forces; operational planning; organizing and maintaining cooperation by all forces and all forms of support; organizing command and control; preparing subordinate command and control bodies and forces for combat operations; supervising and assisting subordinate commanders, staffs and forces; the direct leadership of troops during performance of their combat missions.¹³

As alluded to earlier, the C2 definitions are not necessarily clear, complete, or correct. A NATO publication has this to say about both the US and the NATO definitions:

While both the US and NATO have formal definitions of "Command and Control," these have been developed for legal and institutional purposes. As a result, they are politically rather than scientifically correct. They are not well suited to support research and development efforts. Indeed, these institutional definitions are typical products of consensus building and largely reflect what is considered current best practice, which developed during the Industrial Age. Hence, they do not leave room for approaches that are radically different from the established ways of doing business. For example, they fail to distinguish between the functions of "command" and "control." They also assume that the processes associated with these two concepts are the same throughout the force and across time, despite the fact that we know there are significant differences in the way they occur across echelons, functions, and classes of situations. Moreover, these traditional definitions focus on the formal and legal distribution of authority and responsibility despite the fact that military forces are heavily impacted by informal organizations and linkages. Finally, they assume specific

¹¹ <http://www.dtic.mil/doctrine/jel/doddict/data/c/01088.html>.

¹² <http://www.dtic.mil/doctrine/jel/doddict/data/c/01089.html>.

¹³ <http://www.nato.int/docu/glossary/eng/15-main.pdf>.

structures that are hierarchical and depend on a unitary command function, thus ignoring a host of potential alternatives.¹⁴

B. IMPROVED DEFINITIONS

Assuming the SAS 050 critique of current definitions, which reflect current concepts and thinking about C2, is correct, the question becomes one of redefining C2 as we have known and understood it. Since current definitions generally are descriptive of current practice, they encompass only a small portion of all possibilities. A new, much more comprehensive definition would address all the shortcomings in the current definitions and would include within it all possibilities for exercising the functions of both command and control. This would require a definition of future C2 to be based on a more general theory of C2 and to include sufficient operational content to demonstrate that it encompasses a wide range of alternatives. Such theory exists as a result of the OSD Command and Control Research Program (CCRP). The CCRP has been developing command and control theory over the past decade and a half, promulgating ideas and generating discussion through a series of publications. The theory begins by clearly differentiating between the functions of “command” and those of “control.”

Dr. David S. Alberts is the Director of Research in the Office of the Assistant Secretary of Defense (Networks and Information Integration) and the co-author of several CCRP papers. In the most recent publication, co-authored with Richard Hayes, he offers a description of the key functions of command and control as follows:

Command: the establishment and communication of the initial set of conditions, the continuing assessment of the situation, and changes to intent are the functions of command that we will focus on in this model. the products of command will directly determine, impact, influence, or moderate the following:

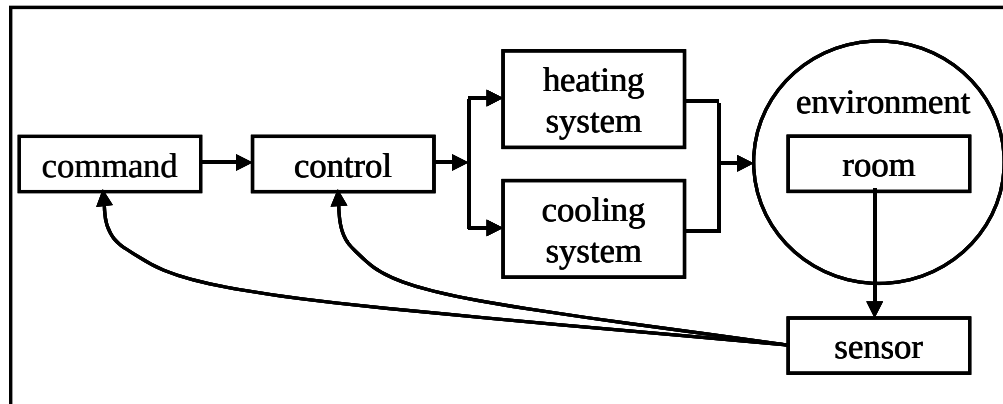
- Intent
- Allocation of roles and responsibilities
- Constraints on actions
- Awareness of the above, including iterative possible futures
- Nature of the interactions among participants
- Allocation of resources including:
 - Information

¹⁴ The January 2006 NATO Studies, Analysis and Simulation 050 Panel (SAS 050), *Exploring New Command and Control Concepts and Capabilities*, Final Report, p. 11.

- Personnel
- Materiel¹⁵

Control: The function of control is to determine whether current and/or planned efforts are on track. If adjustments are required, the function of control is to make these adjustments if they are within the guidelines established by command.” ...” To be most effective the approach to control needs to be consistent with the approach to command.¹⁶

Alberts and Hayes illustrate the essence of the difference between command and control using a simple model of a room temperature control system, as shown in figure 2. Command determines the desired temperature and the control function monitors the environment and takes appropriate action to keep the room at the predetermined level.



Source: Alberts and Hayes, *Understanding C2*, p.19.

**Figure 2. Minimum Essential Conceptual Elements
for a Room Temperature Control Model**

C. EXPANDING OUR UNDERSTANDING OF C2 DEFINITIONS

Alberts then applies this simple approach to a military system in great detail, clearly differentiating between the command and the control functions. Details can be found in the source publication, which explores scores of variables associated with both functions and with C2 as a whole. It elaborates a process view of C2 that is essentially a

¹⁵ David S. Alberts and Richard E. Hayes, *Understanding Command and Control*, Command and Control Research Program, 2006, pp 57–58. This source may appear to be presenting a purely cybernetic model of C2 (as implied by figure 2). However, we believe it gives the subject of command due treatment. For additional viewpoints on the subject of command, see Carl H. Builder, Steven C. Banks, and Richard Nordin, *Command Concepts, A Theory Derived from the Practice of Command and Control*, RAND, 1999; and Marine Corps Doctrinal Publication (MCDP) 6, *Command and Control*.

¹⁶ Ibid., p. 59.

description of the C2 system entities, relationships, and resources. It also elaborates a value view of C2 that applies metrics to the important aspects of the process. The SAS 050 Reference Model expands on these two views and identifies over 300 variables that are important to understanding C2.¹⁷

A brief discussion of writings on alternative approaches to command and its influence on C2 is helpful to understanding possible futures. What follows is a very brief outline of two important explorations of command with roots about 10 years ago at the beginning of the Information Age.

Thomas J. Czerwinski in a 1996 article argued there are basically three ways the function of command can be exercised. They are command by direction, command by plan, and command by influence.¹⁸ He argues that all three approaches can coexist, but that the trend is and should be toward command by influence. However, the power of the network poses a risk, evidenced in the Army Force XXI experiments, that commanders will revert to command by direction because they have the ability to do so. Czerwinski believes this would be a serious mistake, as command by influence is by far the most effective command form for the uncertain conflict environment of the future.

Command-by-direction was essentially the only feasible alternative until about 250 years ago. Commanders observed the battle from a vantage point but, owing to time-distance limitations, could personally command only a portion of it at any point in time. Command-by-plan developed as an attempt to overcome the physical limitations of command-by-direction. It relied on development of and adherence to detailed plans for all components of the force during all phases of the battle. It allowed command of larger forces and more complexity. Command-by-influence has been demonstrated as a highly effective form of C2 in which subordinates carry out the commanders' intent with minimal additional direction or guidance. It requires very well-trained leaders, a high degree of trust within the command and among commanders, and clear understanding of the intent of the operation. The first version of command-by-influence was the German *Auftragstaktik* in WWI, which morphed into Blitzkrieg in WWII.

Alberts wrote in 1994 a paper on command arrangements for peace operations that detailed six different recent historical command approaches that overlap and

¹⁷ *Exploring New Command and Control Concepts and Capabilities*, p. 3.

¹⁸ Thomas J. Czerwinski, "Command and Control at the Crossroads," *Parameters*, Autumn 1996, p. 121.

illustrate two of Czerwinski’s three possibilities – command-by-plan and command-by-influence (see table 1). Alberts was looking at the relationship between the command approach and elements of the control system that must be present for the approach to be effective: he called them “capacity requirements.”

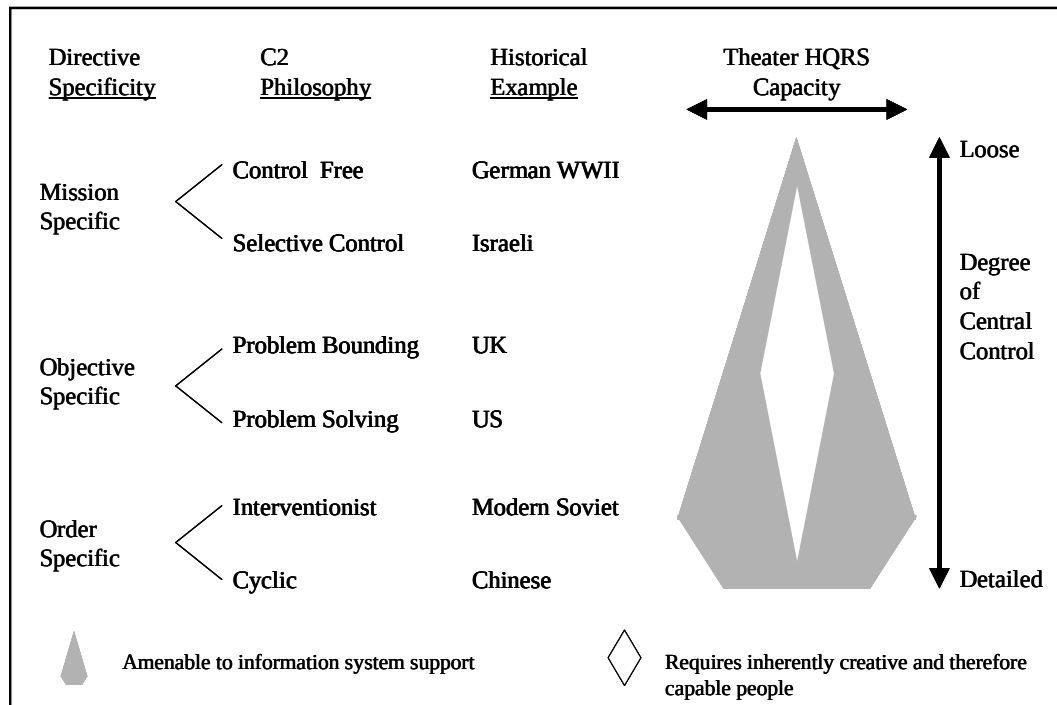
Table 1. Capacity Requirements for Different Command Arrangements

Command Approach	<u>Inputs</u>		<u>Processing</u>	<u>Outputs</u>		<u>Subordinate Attributes</u>	
	Detail of Update	Frequency of Update	Quantity Required	Level of Detail	Frequency	Professional Competence	Creativity/ Initiative
Control-Free	Low	Low	Low	Low	Low	Very High	Very High
Selective-Control	Low	Very High	Moderate/ Low	Low	Moderate/ Low	High	High
Problem-Bounding	Moderate	Moderate	Moderate	Moderate	Moderate	High/ Moderate	High/ Moderate
Problem-Solving	Moderate	Moderate	High/ Moderate	High/ Moderate	High/ Moderate	Moderate	Moderate
Interventionist	High	Very High	Very High	Moderate	High	Moderate/ Low	Moderate/ Low
Cyclic	High	Very Low	High/ Moderate	Very High	Very Low	Low	Very Low

Source: David S. Alberts, Command Arrangements for Peace Operations, Command and Control Research Program, 1994, Figure 16, p. 74.

Table 1 shows that the feasible command approach is very much a function of preexisting conditions; regardless of what a commander may wish to do he is largely bound by those conditions. However, knowing there are actually alternatives and what the preconditions for them are could allow a commander or an institution to change the command approach over time, provided the resources for the change are available. This is what this paper is about and by implication may be an important issue for the CCJO redraft.

Alberts later linked his six different command approaches (C2 philosophy in figure 3, below) to the specificity of the type of directive commanders would issue and gave historical examples of each. He also roughly depicted the capacity of the control system (labeled “theater headquarters capacity” below, corresponding to “processing” in table 1, above) needed for each approach.

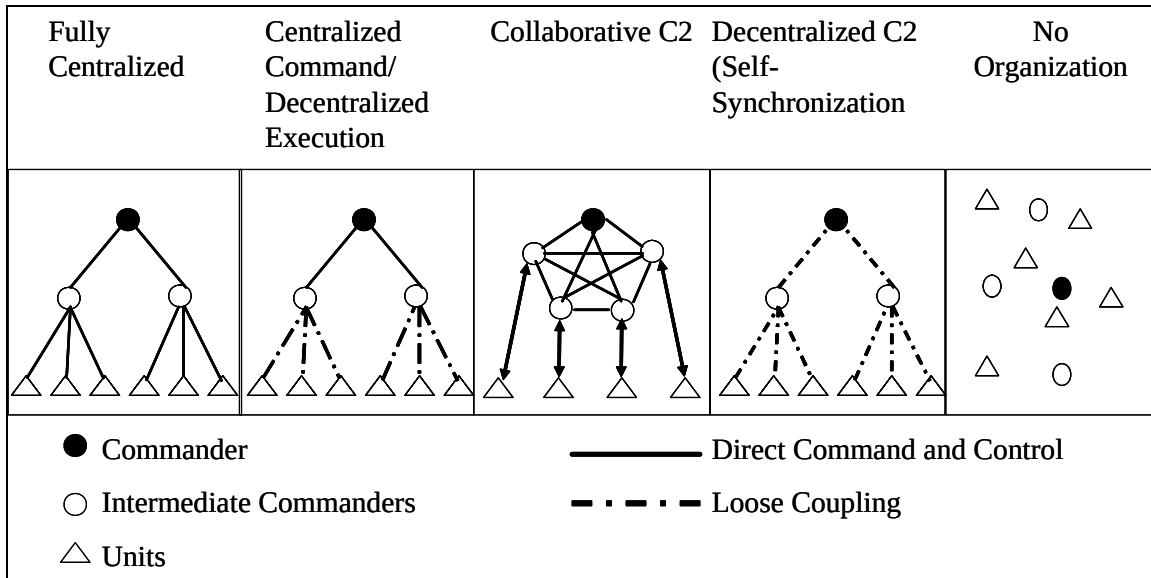


Source: David S Alberts et al., Understanding Information Age Warfare, 2001, Figure 64, p. 170. See text pp 169–175 for details linking each philosophy to a specific historical example.

Figure 3. Historical Choices Among C2 System Philosophy

Alberts also described examples of different C2 organizational options along a broad spectrum of choices. These examples are depicted in figure, 4 below. The key to understanding the graphic is the presence or absence of solid, dashed or arrowed lines representing the kind of coupling between commanders at various levels and the units.

Alberts then offered real world examples of each kind of organization in his spectrum with associated benefits and costs. He labeled the chart Information Age C2 organizations (see table 2, below), indicating that very different C2 organizations are possible and they can coexist.



Source: Alberts et al., *Understanding Information Age Warfare*, figure 66, p. 181.

Figure 4. Spectrum of C2 Organization Options

Table 2. Information Age C2 Organizations

Type	Fully Centralized	Centralized Command; Decentralized Execution	Collaborative C2	Decentralized C2 (Self-Synchronization)	No Organization
Example	72-hour ATO	Desert Storm	Bosnia and Kosovo	Submarine Operations Guerrilla Operations SOF	Rout or Chaotic
Benefits	Optimum Use of Assets	Near-Optimum Resource Allocation Encourages Initiative	Higher Quality Decision-making Units Tightly Coupled Robust	Low Overhead Responsive to Local Situation Changes	Unpredictable to Adversary
Costs	Enormous Overhead / Brittle	Potential for Mutual Interference or Missed Opportunities	Can be Slow to Respond Requires Collaborative Tools and Cooperability	Highly Professional Quasi-Autonomous Units Required	Synergy Accidental Mutual Interference Likely

Source: Alberts et al., *Understanding Information Age Warfare*, figure 67, p. 183.

The point of this short discussion of definitions is to make clear that a C2 approach employed in any particular mission or context is not necessarily or automatically a given, as is normally the case within current military practice. In the past, national military institutions established a C2 approach which leaders then followed, rarely considering alternatives. Future leaders themselves will need, and should have, the option to select a particular approach to JC2 appropriate to their mission and the reigning conditions.

D. METHODOLOGY

With a clearer understanding of what C2 is we conducted a broad survey of doctrine, practice, concepts, theory, and research on C2 in general and various dimensions of it. From that we expected to gain insight into the current thinking about JC2 as well as projections for what it might be in the CCJO future time frame. With the benefit of the research, analysis, and discovery we drew conclusions that led to recommendations.

The survey started with the CCJO itself to determine what it did or did not say about JC2. We then examined joint doctrine, partly because it was included in the original task and partly to see whether it offered any hints about alternative approaches to JC2. Our third task was to look at current operations to document the JC2 approaches taken and to perhaps glean insight for the future. The fourth track was to find other possible sources of insight. This included the Universal Joint Task List (UJTL), the Multi Service Force Deployment (MSFD) Scenarios, and recent joint wargames and experiments.

We then reviewed the most recent OSD Command and Control Research Program publications. As the foregoing discussion of definitions indicates, the CCRP is definitely forward-thinking about C2. Our sixth task was to review the JC2 Functional and Integrating Concepts and other related concepts in the JopsC family of concepts. Finally, to complete our survey we examined the Defense Advanced Research Program Agency and Joint Forces Command advanced work on JC2. We recognize that there may be other sources of information or insight, but time and funding limited the study to those above. Additionally, we believe these sources are sufficient to reach reasonable conclusions about the four basic questions posed by the sponsor.

Our conclusions led to recommendations and possible alternative approaches for improving JC2 coverage. These are detailed with possible line-by-line revisions to the document in appendix A.

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II. JC2 CONCEPTS IN THE CCJO

We examined the CCJO to determine the stated or implied JC2 concepts¹ that must exist as capabilities to maximize the ability of the joint force to operate as envisioned in the document.

As pointed out earlier, JP 0-2, *Unified Action Armed Forces (UNAAF)*, states the following in a lengthy discussion of joint command and control: “Command (the lawful authority of a commander) and control (the regulation of forces and functions to accomplish the mission in accordance with the commander’s intent) *is the most important function undertaken by a JFC [joint force commander]*.”²

Given the importance attached to JC2 in UNAAF it is noteworthy that the CCJO does not address JC2 directly. In fact, the word “command” appears in the document only three times in the text and six times total including footnotes, appendices, and references. The word control appears nine times and only once in connection with the idea of controlling own forces. The function of command and control is not mentioned at all in the concept description and only once in appendix C in a list of processes. Hence, it is fair to say that JC2 is not an explicit concept in the current version of the CCJO.

The CCJO does, however, implicitly address command and control throughout. The CCJO is full of words with implications for JC2 or statements about things that must happen which are inherently JC2 in nature.

A. CENTRAL IDEA

The CCJO central idea clearly requires an agile (i.e., robust, flexible, and adaptable) JC2 approach since without it the overall ideas of the CCJO cannot be operationalized.³

¹ More than just command structures.

² JP 0-2, *Unified Action Armed Forces (UNAAF)*, p. III-13.

³ Agility is the “central characteristic needed to operate with sufficient speed and quality of decision making to operate within an adversary’s decision-making cycle.” Agile Joint C2 “will enable commanders to better deal with the uncertainty, complexity, and dynamism of the future operating environment.” (From: Joint Command and Control Functional Concept, p. 8).

CCJO paragraph 4.A. says:

The joint force, in concert with other elements of national and multinational power, will conduct integrated, tempo controlling actions in multiple domains concurrently to dominate any adversary, and help control any situation in support of strategic objectives.⁴

This could not possibly happen without extensive JC2, and it could not happen optimally without an advanced JC2 approach enabled by properly designed support systems. How the JFC would plan to integrate, control tempo, act in multiple domains simultaneously, or control any situation would be constrained or enabled by the operationalized JC2 approach, as would execution of the plan. Thus, although not explicitly stated, the CCJO concept, to be fully realized, must be encapsulated within a matching JC2 approach. Getting this approach right is a tall order if the JC2 system must work across the range of military operations.

B. FUNDAMENTAL JOINT ACTIONS

The CCJO description of how joint forces will operate is replete with code words that imply the application of a JC2 approach.⁵ For example, the introductory paragraph of section 4. C., “Fundamental Joint Actions,” says:

To enable accomplishment of its particular objectives, the joint force, other agencies and multinational partners take many actions. However, certain fundamental actions are primary *to organizing and integrating efforts in time, space and purpose*. More importantly, through *unified action*, these actions may provide a common basis for *integrating efforts with other agencies and partners*. Such commonality should permit a more coordinated and therefore more effective national effort.⁶ [italics added]

This paragraph says much more about command and control than it does about the actions to which it is referring. Following that introduction, the three “fundamental actions taken by the joint force” in any operation are listed: ⁷

⁴ Ibid. p. 11.

⁵ For example, a word search shows the following words or their derivatives and their frequencies: “unified action” appears 12 times in text and 19 times overall; “integrate,” 48 times; “orchestrate,” 2 times; “balance,” 3 times; “harmonize,” 2 times; “coordinate,” 13 times; “synchronize,” 2 times; and “manage,” 3 times.

⁶ CCJO, p. 12.

⁷ JP 0-2, section 4.C., “Fundamental Joint Actions,” p. 12.

Establish, expand, and secure reach
Acquire, refine, and share knowledge
Identify, create and exploit effects

These three fundamental joint actions cannot take place coherently without JC2. Indeed, embedded within each of these fundamental actions are significant elements of a JC2 approach. For example, determining how the joint force will acquire, refine, and share knowledge is determined by the JC2 approach both from the standpoint of commander's intent and methods established for control. Similarly the JC2 approach determines how effects will be identified, created, and exploited. Based on the procedures and directives thus determined, subordinate capabilities perform under JC2 control to "create and exploit effects." A brief examination of each action from the JC2 perspective follows.

Paragraph 4.C.1. explains the fundamental action "establish, expand, and secure reach." The explanation covers physical, virtual, and human reach. The description of virtual reach includes the notion of "acquire, transmit and monitor information in order to gain knowledge." This is both redundant to the second fundamental action and a distinct C2 function. How this virtual reach would be conducted and how the acquired knowledge would be distributed is a basic C2 variable. Additionally, the explanation of human reach emphasizes that "securing human reach is gained through mutual trust garnered over time."⁸ This statement is most true in the context of JC2 since the entire apparatus is built upon a network of trusted nodes. Without that trust the JC2 system collapses.

The second fundamental action "acquire, refine, and share knowledge" is explained in paragraph 4.C.2. As mentioned above regarding "reach," this is a fundamental function of JC2. The following quote underscores this point:

Knowledge must be timely, relevant, and accurate to be of value, and it must be acquired, prioritized, refined, and shared vertically (strategic, operational, and tactical) and horizontally (within the joint force and among interagency and multinational partners). All knowledge is built on information from integrated strategic, operational and tactical sources, both military and civilian. The future joint force must possess the capabilities required to accomplish this integration.⁹

⁸ CCJO, p. 13.

⁹ Ibid., pp. 13 & 14.

This entire quote is a discussion of both the strength of the information position and the distribution of information. The former is an aspect of the C2 problem space and the latter is the C2 approach with respect to information distribution appropriate to the C2 solution selected by the commander. Suffice it to say that the fundamental joint action identified in paragraph 4.C.2 of the CCJO is very closely aligned with one of the three CCRP-defined theoretical dimensions of the JC2 approach adopted by the joint force.

Paragraph 4.C.3. explains the third fundamental action—“identify, create, and exploit effects.” Although the clues are somewhat more obscure than in the preceding example, this one also has many aspects of JC2 woven through it as the following extract demonstrates. [Important C2 linkages are in italics.]

The JFC considers planned diplomatic, information, and economic tasks that, *when integrated with military tasks*, will cause the desired effects that in turn supports achievement of objectives. The *JFC balances* among the actions of knowledge, reach, and effects to *generate joint synergy* and also attempts to *harmonize military actions* with those of the other instruments to maximize overall impact. Since the outcome of actions taken against a complex system cannot be predicted with precision, it is essential that the *effects be continually assessed and actions adjusted* until the desired effects are created and objectives are achieved.¹⁰

Effects are the results of kinetic, electronic, information or other actions taken by elements of the joint force. Everything leading up to the realization of the effect happens because of the commander’s intent and the control mechanisms that translate intent into plans and/or orders to guide actions.¹¹ As the quoted section illustrates, JC2 is the hidden hand that integrates, balances, synergizes, harmonizes, assesses, and adjusts actions. How well this hidden hand does those things is a function of how appropriate the JC2 approach is for the situation at hand and the particular application of national or multinational power available and applied to solve the problem.

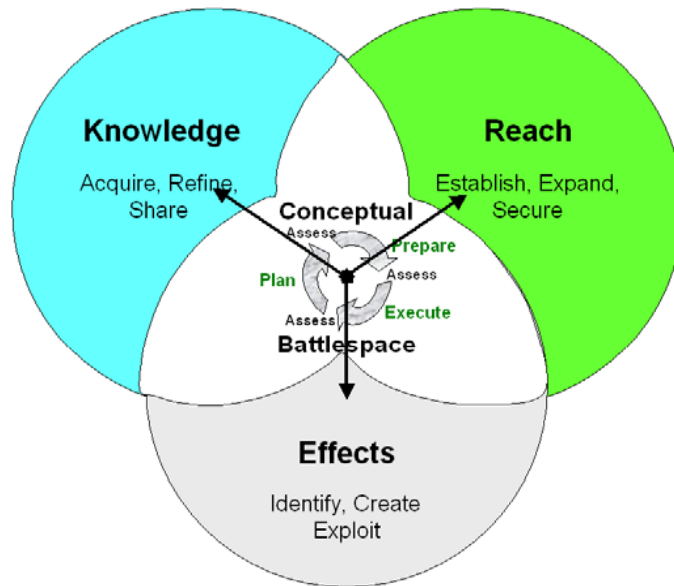
Paragraph 4.C.4., “Joint Force Commander’s Conceptual Battlespace,” is all about JC2, as illustrated by the following two citations and the Venn diagram (figure 5), below:

The JFC *orchestrates* military actions within a continuous operations cycle of *planning, preparing, executing, and assessing*.

¹⁰ Ibid., p. 14.

¹¹ Of course, the realization of the effect can be modified/affected by exogenous factors such as the actions of adversaries and neutrals, luck, actions of subordinates, etc.

The JFC will also continuously *balance* the military effort in concert with other instruments of national power. The JFC *harmonizes* military with nonmilitary capabilities by identifying shared interests among disparate actors, and *coordinating all actions* in pursuit of mutually beneficial and complementary objectives.¹² [Italics added]



Source: CCJO, Figure 4, p. 15.

Figure 5. Conceptual Battlespace

Paragraph 4.C.5,. “Fundamental Actions in the Context of Unified Action,” is also essentially about JC2. One sentence in particular makes the point: “*Coordination links, greater mutual understanding* [trust] between partners and *practiced procedures* assist in attaining unified action.”

C. SUPPORTING IDEAS

The embedding of C2 concepts in the discussion continues in section 4.D, “How the Future Joint Force Will Operate-Supporting Ideas.” The best example is the section on integrated and interdependent actions. Another is the section on controlling tempo. Without belaboring the points already made, we point out that the same C2 code words appear again and again throughout the CCJO’s “Supporting Ideas,” demonstrating that JC2 is an integral part of the CCJO.

¹² Ibid., pp. 14 and 15, respectively.

D. APPENDICES

The extensive, albeit implicit, treatment of JC2 by the CCJO carries over to the appendices. Appendix D is devoted to “Integration of Joint Activity,” which is what JC2 is supposed to do.¹³ The discussion of a new framework for campaign design using the concept of lines of effort argues that the old practice of phasing resulted in a “lack of flexibility” and “inadequately reflected the importance of integrated effort among all interagency players.”¹⁴ It goes on to assert that “an integrated and flexible approach” providing a “means to plan, execute and assess campaigns in an integrated manner” is needed and that using the concept of lines of effort better enables the JFC to do this.¹⁵

The familiar code words are sprinkled throughout the Appendix D discussion, but by far the clearest statement relating to JC2 is found in the penultimate paragraph, which says:

The JFC’s *vision* of how a campaign should unfold will drive subsequent *decisions* regarding the selection of specific activities within each line of effort and which lines of effort will be accentuated. It de-emphasizes sequencing and emphasizes simultaneity. By *integrating* the *JFC’s conceptual battlespace* with a comprehensive campaign framework, JFCs may be able to *better articulate their intent* and assign the most relevant tasks to subordinate commanders. By *arranging operations and activities* into subsets, the JFC can better *integrate* and *synchronize subordinate operations in time, space, and purpose*. This coordinated action may enable the successful accomplishment of certain activities early in a campaign that subsequently reduces the overall effort needed to achieve future objectives.¹⁶ [Italics added]

This statement is squarely in the realm of JC2. It mentions both dimensions of JC2—command and control—and cites *vision* and *intent* as bases for organizing and assigning tasks. Thus it is in essence a partial description of JC2.

E. SUMMARY AND ANALYSIS

In short, the CCJO is all about joint command and control but without clearly acknowledging it. However, because the CCJO is not explicit about JC2, it cannot make an unambiguous statement about the importance of JC2 to the overall concept. And by not clearly articulating its bedrock importance to the concept the CCJO fails to convey

¹³ Ibid., p. D-1.

¹⁴ Ibid., p. D-2.

¹⁵ Ibid.

¹⁶ Ibid., p. D-4.

that it envisions a future that could include approaches to JC2 that are very different from the limited variants of essentially a single doctrinal approach used by a JFC today.

To execute the types of operations envisioned in the CCJO across the range of military operations it seems clear that very different C2 setups may be required. We do not know how much these future JC2 approaches must differ from current practice in order to optimally effectuate the actions postulated in the CCJO as the fundamentals of future operations. But the CCJO should lay down a clear marker that it expects to see differences, and it should take that into account now. Absent a clear statement, a reader or a Service, in good faith and ignorant of future JC2 possibilities, could erroneously conclude that current JC2 is adequate to every task or situation, never knowing that such an interpretation would lead to sub-optimal (or worse) application of joint capabilities.

The UNAAF states that JC2 is the most important function undertaken by a JFC. Indeed, it can be argued that JC2 is the *only* truly important function undertaken by a JFC. If that assertion is accepted as true, then it likely follows that no single approach or narrow range of JC2 options is suitable for all situations. Moreover, if there are potentially different JC2 approaches, it will be essential to educate and train future commanders and staffs on JC2 to ensure they have the vision, know-how, ability, understanding of authorities, and tools to tailor JC2 to match both the mission and the set of resources and tasks that are the JFC's responsibility. The availability of options permitting this kind of flexible JC2 may be crucial to optimizing joint force performance. Absent flexible JC2, mission failure could result. Therefore, getting the concept of future JC2 right is crucial to getting the CCJO right.

F. CONCLUSION

We have attempted to “extract from the CCJO the stated or implied JC2 concepts that must exist as capabilities to maximize the ability of the joint force to operate as envisioned in the document.” The foregoing satisfactorily addresses only part of the task and concludes that there are no stated JC2 concepts in the CCJO. With respect to implied JC2 concepts the CCJO offers only hints. Therefore, we are unable to directly determine the implied JC2 concepts. This is because those implied concepts are determinable only by inference through code words that must be deciphered and interpreted by the reader. This leaves wide latitude for both alternate interpretations and misunderstanding. We infer that the frequent indirect references to JC2 throughout the document imply that changes to the JC2 status quo are expected and intended. We hypothesize from these

indirect references that a more flexible, tailorable JC2 support system will also be needed—a system capable of accommodating different approaches appropriate to the situation and mission. What that kind of JC2 could look like and how to describe it remain unresolved.

The task remains, then, to find more concrete evidence of alternatives to the JC2 status quo, document them and determine their relevance to the CCJO. The study tasks discussed in subsequent chapters are designed to systematically examine other sources of insight into how future JC2 might look and function.

III. JC2 DOCTRINE

This chapter reviews current JC2 doctrine to determine whether it is adequate for the CCJO vision and/or provides insight into how it might be better aligned with future iterations of the CCJO.

In 1999 the Joint Staff commissioned a study of joint command and control doctrine.¹ The study concluded that several documents—JP 0-2 *Unified Action Armed Forces*; JP 5-00.2, *Joint Task Force Planning Guidance and Procedures*; and 16 other publications—each provide at least a chapter on C2 or a related subject such as organization or command relationships. In addition, the study noted other doctrinal publications that address specific C2 issues such as C2 of joint air operations. At the time, there was no separate joint publication on Command and Control, and the study recommended against developing one. The study noted that JP 0-2 provides the basic tenets of JC2, and when it is supplemented by JP 3-0 (*Doctrine for Joint Operations*) and JP 5-00.2, the three are the foundational documents relative to JC2 from which the others are derived. Although many of the joint doctrine publications have been updated since the Joint Staff study, often incorporating study recommendations, the basic body of doctrine remains essentially the same. We reviewed the three documents and selected others as outlined below.

A. UPPER-LEVEL DOCTRINE

1. JP 1, Joint Warfare of the Armed Forces of the United States (14 November 2000)

JP 1 is the capstone publication for all joint doctrine. As such it is an overview document that describes in very broad terms the context in which joint forces will operate in support of the national military strategy. In chapter 5 it outlines the fundamentals of joint operations but defers to JP 3-0 and JP 5-0 (both discussed below) for details. However the overview discussion emphasizes the importance of clear commander's intent, unity of command, unity of effort, clear lines of authority, and integration of Service and functional component capabilities—all aspects of JC2.

¹ Joint Command and Control Doctrine Study, 1 February 1999.

Chapter 6 covers interagency operations. It makes clear that the challenge for the JFC is “to guide the proper employment of the military instrument and to assure unity of effort with the diplomatic, economic, and informational instruments of national power.” (p. VI-1). Moreover, “interagency operations may be conducted in the United States and abroad. Combatant commanders and other JFCs must consider the potential requirements for interagency operations as a part of their activities across the range of military operations. Early inclusion of interagency considerations in assessments, estimates, and plans will facilitate civil military integration of effort, focus the appropriate military participation, and assist the military effort to obtain the best available support from other interagency participants.” (p. VI-1) The chapter focuses on coordination, command relationships and organizing for interagency operations—again all areas that the JC2 approach directly impacts.

Chapter 7 covers multinational operations in broad terms. It points out that US forces usually operate with foreign partners—both military and NGO/PVO—and that the goal of unity of effort remains although it may be more challenging to achieve. The chapter discusses C2 of US forces when in a multinational setting; alternative command arrangements for a multinational force; challenges of integrating separate communications and intelligence systems; integration of IGOs, NGOs, PVOs, and contractors; and other JC2 issues.

In summary, JP 1 describes in broad terms realities that cannot be wished away and that current and future JC2 approaches must take into account. In fact, the summary chapter underscores the need for any joint force to be interoperable (physically, structurally, and mentally) not only with any combination of forces provided by the Services but also with any other combination of partners—foreign military or civilian. (pp. VIII-2 to VIII-5). This is at its core a JC2 issue. The question to explore further is whether the CCJO adequately and explicitly takes these realities into account in a clear statement on future JC2.

2. JP 0-2, Unified Action Armed Forces (UNAAF) (10 July 2001)

The five chapter titles make clear that JP 0-2 is itself a component of the US military joint command and control system. The chapters define terms and authorities, relationships, command structures, and control mechanisms. Each is summarized below.

Chapter 1, titled “Doctrine and Policy Governing Unified Direction of Forces,” includes a graphic (figure I-7, p. I-2) that depicts the two distinct branches of the chain of command and control from the President through 1) unified commands, subordinate unified commands to Joint Task Forces and Functional Component Commands; and 2) military departments to Service component commands. The entire chapter is devoted to different command authorities, relationships, and how unified action is supposed to be achieved. The chapter describes the “standard organization” (through the COCOM to the subordinate joint headquarters), but a caveat on the diagram says it is not the prescriptive joint force organization. Despite this caveat, the chapter leaves the impression that this standard organization is expected to be followed.

Chapter 2, “Functions of the Department of Defense and Its Major Components,” covers roles, functions, and responsibilities of DoD, its agencies, the military departments, and the Joint Chiefs of Staff. It includes the CJCS responsibility for managing the National Military Command System and establishing “operational policies and procedures for all components of the NMCS.” (p. II-9) It also covers functions and responsibilities of the COCOMs, including broad authorities that relate to JC2, but it provides no specific detail.

Chapter 3 is titled “Doctrine and Policy for joint command and control.” From a JC2 perspective this chapter is key. It outlines general principles; command relationships and assignment of forces; and combatant commander *command authority*, including detailed explanations of operational control, tactical control, and support. It also includes a section specifically on JC2 that opens with the statement that “command.... and control... is the most important function undertaken by a JFC.”(p. III-13) The JC2 section covers C2 theory, organization for JC2, and JC2 support. The discussion of theory describes the desired JC2 attributes or tenets and suggests JOPES as the model for making decisions. In fact this discussion does not really lay out a C2 theory but, rather, describes desirable characteristics of any C2 approach and without being explicit tends to offer one approach.

Chapter 4 covers “Multinational Operations.” It correctly points out the challenges to unity of effort and unity of command and provides a notional multinational command structure. It briefly discusses a couple of organizational options. It also details C2 of US forces in multinational operations.

Chapter 5, “Doctrine and Policy for Establishing Joint Commands,” covers establishing joint forces at the unified command, subordinate unified command, and JTF

levels and organizing those forces. It states, “A JFC has the authority to organize forces to best accomplish the assigned mission based on the concept of operations” (p. V-2) but then presents a diagram of components (figure V-1, p. V-3²) in a joint force in the standard arrangement. Thus, although it acknowledges other possibilities, the discussion tends to point the reader in the customary direction. Indeed, it goes on to state that all joint forces include Service components. Detailed discussion of the three levels of joint forces also includes diagrams of the normal configuration. Chapter 5 also covers the commander, his staff, and the components (with emphasis on the Service component commands) as well as discipline and personnel administration (including courts-martial and efficiency reports).

In summary, JP 0-2 does a thorough job of detailing the existing JC2 approach and its supporting authorities, organizations, and procedures. It does not rule out alternative approaches, but it gives no indication of what those might be. It is very much a status quo document and does not promote or envision more innovative solutions to the JC2 problem.

3. JP 3-0, Doctrine for Joint Operations (10 Sept 2001)

Like JP 0-2, JP 3-0 is itself a component of the US military joint command and control system. Its six chapters explain how joint operations will be conducted across the range of military operations. Consequently, it complements JP 0-2.

Chapter 1, “The Strategic Context,” discusses the strategic environment within which joint operations take place. It makes clear that threats are now “more ambiguous and regionally focused than during the cold war.” It emphasizes the need for forces to be ready to operate with interagency and multinational partners in addressing complex problems with particular emphasis on military operations other than war (MOOTW) along the range of military operations. By implication this affects JC2. It also covers the necessary linkages between national strategy and campaigns.

Chapter, 2, “Fundamentals of Joint Operations” essentially summarizes the same materiel in JP 0-2. It does, however, expand on the topics of organizing joint operational areas and urban operations.

² The figure shows Service components and functional components (special operations, land, maritime, and air).

Chapter 3, “Planning Joint Operations,” discusses planning in much greater detail than JP 0-2. Since planning is a critical component of JC2 this chapter is at the core of the subject. In the context of planning it covers synergy, simultaneity and depth, anticipation, balance, leverage, timing and tempo, operational reach and approach, forces and functions, and arranging operations. All of these are concepts important to the CCJO with JC2 implications. It covers commander’s intent and implementation of that intent through plans. Finally, it includes control and coordinating measures and functional COCOM support.

Chapter 4, “Joint Operations in War,” discusses the complexities and friction inherent in conventional operations. Although the discussion is full of implications for JC2, command and control as a concept is not directly mentioned. Chapter 5, “Military Operations Other Than War (MOOTW),” does not directly address JC2, but the implications of MOOTW for JC2 are implied. The chapter emphasizes that JC2 must be equally effective throughout the range of military operations. Chapter 6, “Multinational Operations,” addresses the subject in much the same way that JP 0-2 addresses it.

In summary, JP 3-0 does a thorough job of detailing doctrine for joint operations. It addresses several important dimensions of JC2 and complements JP 0-2 in that regard. From the operational perspective it appears to assume that the existing JC2 approach and systems are adequate since they are incorporated into the discussion without comment. JP 3-0 does not rule out alternative approaches, nor does it in any way imply that they might be needed. It is neutral on this score despite the emphasis on MOOTW and multinational operations where clear, major JC2 issues abide. Thus, like JP 0-2 it is very much a status quo document regarding JC2.

4. JP 5-0, Doctrine for Planning Joint Operations (13 April 1995)

The four chapters of JP 5-0 cover joint operation planning processes and concepts; strategic direction and integration; deliberate and crisis action planning; and the relationship between joint operation planning and assessment. It focuses on planning and therefore is about JC2. But it mostly describes the existing elaborate joint campaign planning process and offers no insight into alternative possibilities. It is an 11-year-old status quo document.

5. JP 5-00.1, Joint Doctrine for Campaign Planning (25 January 2002)

Although JP 5-00.1 is more current than JP 5-0, the two are very parallel—they both are about planning and, thus, about JC2. JP 5-00.1 covers in somewhat greater detail

the deliberate planning process and crisis action planning incorporating the multinational and interagency dimensions. For the most part, it describes the nature of campaign planning and the rationale for the way things are done. It mentions “lines of operations” in appendix B, not as an organizing principle or JC2 construct but mainly as a way to think about directional orientation in geographic terms. In short, the doctrine is fine but offers little help with respect to the CCJO.

6. JP 5-00.2, Joint Task Force Planning Guidance and Procedures (13 January 1999)

This document is a cookbook for establishing a JTF. It covers JTF headquarters organization and staffing; the duties of the staff directorates; subordinate commands; and command and control. The chapter on subordinate commands states: “Most often, joint forces are organized with a combination of Service and functional component commands and subordinate task forces with operational responsibilities.” An included graphic shows the standard configuration³ and the accompanying discussion covers the same familiar ground.

The chapter on JC2 is only 10 pages long, but it nonetheless is consistent with other doctrine publications. The discussion does introduce rules of engagement and combat identification as C2 topics not mentioned or covered in detail in the other higher-level doctrine documents. It also raises multinational operations as a C2 issue that a JTF commander is likely to encounter.

7. JP 6-0, Joint Communications System (20 March 2006)

JP 6-0 is the one of the most recent doctrinal publication addressing JC2 reviewed for its relevance to the CCJO. While focused primarily on the C2 support system, it introduces potentially powerful factors with respect to JC2, namely the Global Information Grid (GIG) and network-enabled operations.

The GIG is the Department of Defense’s end-to-end communications system supporting the JFC. It includes all joint and Service communications as well as interfaces to non-DOD and multinational users.(p. I-1) It is intended to connect—for the first time—all nodes in an operation through a single system, making network-enabled operations possible. According to JP 6-0:

³ Figure III-1 of JP 5-00.2 shows Service components and functional components (special operations, land, maritime, and air) plus CMOC TF and JPOTF.

The modern communications system allows the interconnection (networking) of geographically separated forces which permits network enabled operations. Network enabled operations are military operations that exploit state-of-the-art information and networking technology to integrate widely dispersed human decision makers, situational and targeting sensors, and forces and weapons into a highly adaptive, comprehensive system. Network enabled operations exploits the combat power derived from the robust networking of well-informed, geographically dispersed forces. A networked force can increase combat power, achieving greater speed of command decisions and increasing the lethality, survivability, and responsiveness of the force.

At times, improvements in technology can result in leaps in capability, and the networking of the joint force is a case in point. The communications system enables collaborative planning, the COP, control of manned and unmanned tactical reconnaissance and attack platforms, increased visibility of logistic assets, and a reduced footprint through remote staffing.” (p. I-3)

The implication of this passage is that GIG-supported network enabled operations may offer the future JFC commander options that include different approaches to JC2 than have been possible in the past.

Echoing the *UNAAF*, JP 6-0 asserts:

No single activity in military operations is more important than C2. Alone, C2 will not destroy a single adversary target or affect a single emergency re-supply. Yet, none of these essential joint force activities, or any others, would be possible without effective C2. A superior communications system helps commanders to maintain the unity of effort to apply their forces’ capabilities at the critical times and places to win. In fact, C2 encompasses all military functions and operations, synchronizing them into a meaningful whole. C2 is the means by which a commander recognizes what needs to be done and sees to it that appropriate actions are taken. (p. I-1)

JP 6-0 goes on to emphasize that the C2 system’s core element is people—the commander, staff, and every other human participating in the mission. The people are the glue that makes the C2 system function. The remainder of the system “taken collectively, are the facilities, equipment, communications, and procedures essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned. Effective C2 starts with well-trained and qualified people and an effective guiding philosophy and procedures. (p. I-1)

JP 6-0 makes a key point about information and C2:

In one way or another, C2 is essentially about information: getting it, judging its value, processing it into useful form, acting on it, and sharing it with others. There are two basic uses for information. The first is to help create situational

awareness (SA) as the basis for a decision. The second is to direct and coordinate actions in the execution of the decision. The communications system must present information in a form that is both quickly understood and useful to the recipient. Many sources of information are imperfect and susceptible to distortion and deception. The seven criteria shown in Figure I-1 [accuracy, relevance, timeliness, usability, completeness, brevity, and security] help characterize information quality. Combining pieces of information with context produces ideas or provides knowledge. C2 is as much a problem of information management (IM) as it is of carrying out other warfighting tasks. Good IM makes accomplishment of other tasks less complex. Automation and standardization of communications system processes and procedures improve IM and assist the commander's effectiveness and speed of C2. Today, improved technology in mobility, weapons, sensors, and communications continues to reduce reaction time, increase the tempo of operations, and generate large amounts of information. If information is not well managed the reactions of commanders and decision makers and ultimately the joint force may be degraded. It is essential that the communications system complement human capabilities and reduce or eliminate known limitations. (p. I-2)

Finally JP 0-6 emphasizes the following:

A well crafted and coordinated set of integrated, interoperable procedures is important, to operating in joint, multinational, and interagency context of current and future operations. The value of technology, organization, and strategy is diminished in the absence of a professional force to leverage their value. To meet uncertain challenges on the horizon, communications system professionals must be fully indoctrinated in employment of joint and multinational warfighting capabilities. They must also be trained to anticipate and counter the dynamics of an asymmetric adversary. A comprehensive and thoroughly rehearsed set of operational procedures is crucial to developing that required degree of proficiency. The communications system must be of sufficient scale, capacity, reach, and reliability to support evolving operational and training missions. Additionally, the communications system must integrate new technologies into a robust, standards-based, network-enabled environment, to facilitate delivery of the right information to the right location at the right time in an actionable format. (p. I-3)

The doctrinally secure and robust communications system as described in JP 6-0 is designed such that:

The JFC the means to exercise authority and direct forces over large geographic areas and a range of conditions ... and will include interface(s) with governmental and nongovernmental organizations (NGOs), local officials, and multinational forces.” (p. I-4) It will enhance Joint and multinational operations and interagency coordination, strategic agility, operational reach and tactical flexibility. It will create for the first time the conditions for network-enabled operations as described above, and JP 6-0 asserts that it will enable the JC2 system to win the fight for information superiority provided “DoD ... develop(s) doctrine, tactics, techniques, and procedures (TTP), organizational relationships, and technologies to win this fight. (p. I-4)

Of the joint doctrine publications surveyed to this point, JP 6-0 is by far the most visionary in its description of the potential impact of the information revolution on JC2. It alone ventures beyond the status quo in describing how network-enabled operations might actually empower a future JFC. While it does not venture into the realm of C2 theory, it certainly describes a GIG-enabled potential capability to operationalize different JC2 approaches as envisioned in the theoretical work of the CCRP. The existence of network-enabled operations could permit tailoring JC2 to the problem and resource set rather than simply applying the status quo standard template JC2 solution described in the other doctrine publications.

B. SUBORDINATE-LEVEL DOCTRINE

In addition to the more general doctrine publications discussed in section A, there are three publications within the *Operations* series of joint publications that specifically address C2 of the joint force. These publications provide “fundamental principles and doctrine for the command and control of joint operations throughout the range of military operations” for air operations, land operations, and maritime operations, respectively. A fourth publication in the series that is still in “draft” provides the doctrine for the functioning of a Joint Task Force (JTF) Headquarters. In the following subsections we review these publications and assess their applicability to the CCJO.

1. JP 3-30, Command and Control for Joint Air Operations (5 June 2003)

According to JP 3-30, “Joint air operations are performed with air capabilities/forces made available by components in support of the joint force commander's (JFC's) operation or campaign objectives, or in support of other components of the joint force.” (p. vii)

To perform air operations, JP 3-30 mentions briefly that there are several organizational options the joint force commander (JFC) could employ, but *normally* [emphasis added] the JFC will designate a functional component commander, the joint force air component commander (JFACC). All component commanders are responsible for making air capabilities and forces available to support the JFC's mission, and those capabilities and forces are then tasked directly by the JFACC based on the JFC's air apportionment decision. Doctrinally, only the JFC has the authority to reassign, redirect, or reallocate a component's air capabilities and forces.

In addition to exercising tactical control for both offensive and defensive air operations, to include execution planning, coordination, and deconfliction associated with

joint air targeting, the JFACC also has responsibility for planning, coordinating, and developing airspace control procedures and operating an airspace control system. The JFACC is also responsible for planning, coordinating, allocating, and tasking assigned airborne ISR assets. According to JP3-30, joint air operations are conducted using the principle of centralized control and decentralized execution. This allows for unity of command and unity of effort while fostering initiative, responsiveness and flexibility.

Chapter 2, “General Characteristics,” discusses air operations C2 in detail, including command relationships, responsibilities, organization, and primary processes and activities. The discussion of the organization of the JFACC’s staff in the Joint Air Operations Center (JAOC) briefly mentions that JAOC organizations may differ and that, while some functions should always remain the same, “divisions, cells, or teams within the JAOC should be established as required. (p. II-7) (This includes the use of various liaison officers from both US components and other mission partners; a list of eight “typical” liaison teams is presented in appendix B of JP 30.) This statement at least appears to allow a the JFACC a little latitude to tailor the organization of his staff to the context of the mission at hand, but it does not say anything about the overall C2 approach the JFACC is allowed to adopt in the performance of his mission.

Finally, chapter 3 is dedicated to the planning process and attendant staff functions that will be accomplished and the products produced to successfully conduct joint air operations. It is intended for the members of the C2 element; consequently, it is below the conceptual level of the CCJO. Appendices B and C respectively lay out the “liaison elements” and the “functional components” found in a typical JAOC and outline their primary responsibilities.

In summary, JP 3-30 is very clear regarding the structure, relationships, tasks, and processes of the air component of a joint force. However, while the publication states that the “organization [of the force] should be sufficiently *flexible* to accomplish the planned objectives while *adapting* to inevitable changes in the operational environment,” (p. I-2), it does not ascribe these same two attributes to the C2 structure. Although the publication does allow for a C2 approach to air operations without the designation of a functional component commander (e.g., where the JFC himself retains operational control and the JFC staff performs the functions), it makes it very clear that such adaptability is not the norm: “Variations to the relationships and procedures contained herein may be necessary to accommodate theater specific needs, but such variations must be the exception rather than the rule.” (p. I) Additionally, it states: “Though missions vary widely across the

range of military operations, the *framework and process for C2 of joint air operations are consistent.*”⁴ [emphasis in original] (p. I-4)

Thus, it is difficult to imagine the current doctrine for joint air operations as being always compatible with or applicable to the command and control of the future joint force (or at least the air operations aspect) as envisioned in the CCJO. As written, JP 3-30 does not easily translate into the fundamental actions and supporting ideas outlined in the CCJO. While the C2 approach discussed in the publication potentially has some of the characteristics of the CCJO force, when such characteristics appear in the publication it is usually in the context of the “force” and not the organization exercising command and control of that force. It appears that the structure, relationships, and processes outlined in the doctrine are such that the commander of the future joint force has little ability to tailor the command and control of air operations to the specifics of his mission and that the doctrine does not allow a commander to design or select an approach beyond the “traditional way of doing business.”

2. JP 3-31, Command and Control for Joint Land Operations (23 March 2004)

According to JP 3-31, land operations can be conducted either under the direct purview of the JFC or in one of three ways. As stated in JP 3-31, “If the JFC does not choose to retain control at the JFC level, there are three primary options available to the JFC for organizing land forces from two or more components. The options are *subordinate JTF; Service components; or functional land component* with a joint force land component commander (JFLCC).”⁵ (p. v)

To help in selecting an option, the publication describes a number of factors the JFC should take the following into account: mission; scope of operations; requirement for integrated planning; duration of operations; experience of subordinate commanders; and requirement for multinational operations. Obviously, each option has advantages and disadvantages the JFC and staff also must consider prior to a decision to organize the force under any particular C2 option.

⁴ Appendix C (p. C-1) opens with the following caveat: “Dependent on theater and contingency, and whether the mission involves war or MOOTW, the composition, organization, and functions of the JAOC may need to be tailored. However, the basic framework still applies.”

⁵ The passage goes on to say, “The designation of a JFLCC normally occurs when forces of more than one Service component participate in a land operation and the JFC determines that doing this will achieve unity of command and effort among land forces.”

According to the doctrine, the JFC can approach C2 in several ways, depending on the particulars of the mission context and overall situation. These words ring hollow, however. Essentially ignoring two of the options, the overwhelming thrust of JP 3-31 provides the “guidance for the planning and conduct of land operations by joint forces under the C2 of a JFLCC in an area of operation.”⁶ (p. xi) In other words, starting with Chapter 2, the publication discusses C2 in the context of the JFC having selected the “functional command” model (i.e., JFLCC-centric).

Chapter 2 discusses how to form a JFLCC. It also discusses in detail the roles, responsibilities, and functions of the JFLCC organization—essentially to “plan, direct, and coordinate a number of core functions that are critical to the successful execution of land operations. These functions are movement and maneuver; intelligence, surveillance, and reconnaissance (ISR); fires; C2; force protection; and logistics.”⁷ (p. II-7)

The command authorities of the JFLCC and the internal and external command relationships to the functional land component are discussed in detail Chapter 3, “Command and Control of the Joint Land Force.” Basically, doctrine states, “The JFLCC is responsible for land operations as assigned and establishes command relationships for subordinate forces ... In addition to command relationships, the JFLCC determines how the liaison officer (LNO) needs to relate to the JFC and other functional or Service components based upon mission requirements. Liaison between the JFLCC and other organizations (i.e., JFC, functional/Service components, other government agencies, and nongovernmental organizations) is an important consideration when determining manning requirements within the JFLCC staff. (p. III_6) The chapter also discusses several of the unique issues that must be addressed when forming a functional land component in a multinational (alliance or coalition) environment. These include: command authority; intelligence classification and disclosure issues, integration of forces and understanding of capabilities, rules of engagement; and logistics. (p. III-8)

⁶ This doctrinal emphasis on using the JFLCC as the primary organizational construct for land operations begins with Chapter 2, “Forming the Joint Force Land Component.”

⁷ It is curious in a doctrinal publication concerning C2, where C2 is arguably *the* function of the commander and his staff, that C2 is listed as one of several functions for which the JFLCC and staff plan, direct, and coordinate (also functions of command and control). Additionally, a sentence in chapter 4 states: “Planning complements and enhances joint land force C2.” This sentence makes little sense. Since, according to higher-level doctrine, *planning* is a core function of command and control itself, how can it “complement and enhance” command and control of the force? Although these two examples are admittedly only a minor portion of the document, they cause one to wonder if the authors themselves actually understand the concept of C2.

The first part of chapter 4, “Plans and Operations,” presents a detailed look at the processes and products associated with the C2 function of planning. Part B discusses the primary responsibilities of the JFLCC with regard to operations.

Appendix A of JP 3-31 lists the organization and primary responsibilities of the JFLCC staff sections, which are the standard J-1 through J-9.

The JFLCC’s staff is organized based upon the mission and forces assigned and attached. Because creating a new staff would be very time consuming and inefficient, the staff organization will most likely be derived from an existing command structure. The most likely candidates are an Army corps, a MAGTF (most likely a Marine expeditionary force), Army Service component command or, when separately constituted, a numbered army. Augmentees from the other Services are integrated into the core staff to form the JFLCC’s staff. While [JP3-31] depicts a notional staff organization, it is not prescriptive. The practical assumption is that the actual staff organization is based on the staff organization of the corps, MAGTF, or army that forms the core of the staff with some staff members being dual-hatted. Therefore, the actual location of certain sections (e.g., engineer) and the specific special staff vary according to the organization of the core staff and METT-T.⁸ (p. A-1)

Of note, the Operations Staff Section (J-3) is given the task of “recommending JFLCC organization” although no further doctrinal guidance is made available in the publication.⁹ (p. A-6)

In summary, JP 3-31 does a great job of providing doctrinal guidance for how to form a functional land component command, and it discusses the responsibilities, tasks, and processes to be used. Although it gives both a direct and indirect nod to alternative C2 structures and organizations, including stating that “mission” drives organization, the document provides extremely little follow-up guidance to enable the reader to expand on these ideas. The lesson to be drawn is that there is *one* way to approach command and control—the “standard” JFLCC command structure. Therefore, for many of the same reasons discussed in the preceding section regarding JP 3-30, JP 3-31 has only limited applicability to the command and control of the future joint force envisioned in the CCJO.

⁸ Essentially, these same words appear in JP 3-32.

⁹ It appears that this task is in relation to the operational forces being commanded and controlled by the JFLCC, not the structure of the C2 organization itself nor its approach to C2.

3. JP 3-32, Command and Control for Joint Maritime Operations (8 August 2006)

JP 3-32 “provides doctrine for the command and control of joint maritime operations throughout the range of military operations.” (p. i) Like its sister publications JP 3-30 and JP 3-31, JP 3-32 has a singular focus on the functional component command option (JFMCC):

It addresses command relationships and the considerations, procedures, and options for conducting joint maritime operations under a functional component commander. This includes the establishment, authority, and responsibilities of a joint force maritime component commander and the formation, functions, and organization of a joint force maritime component command element and staff. (p. i)

The publication acknowledges there are other ways a JFC can organize his command besides using a functional component command.¹⁰ (p. v) Chapter 2 contains a limited description of “other options”:

The JFC normally designates a JFMCC. On rare occasions, however, there may be situations where designation of a JFMCC is not required. Typically, this would occur when a conflict or situation is of limited duration, scope, or complexity. In cases where the JFC does not designate a JFMCC, the JFC may elect to directly task maritime forces. If this option is exercised, the JFC’s staff assists in planning and coordinating maritime operations for JFC approval. The JFC can elect to centralize selected functions (planning, coordinating, and tasking) within the staff to provide direction, control, and coordination of the joint force.¹¹ (p. II-11)

Nevertheless, JP 3-32 makes it very clear that focusing on the functional component command approach for command and control of joint maritime operations (JMO) is *the* way to conduct C2: “Variations to the relationships and procedures contained herein may be necessary to accommodate specific needs, but such variations must be the exception rather than the rule.” (p. I-1)

Chapter 2 discusses in detail the roles, responsibilities, and functions of the JFMCC organization. As stated in the publication, these functions include command and control; coordination and deconfliction; communications system support; intelligence, surveillance, and reconnaissance; movement and maneuver; fires; force protection;

¹⁰ Page v also states: “JFCs can conduct operations through subordinate joint task forces, Service components, functional components, a combination of Service and functional components, or, in operations of limited scope and duration, the JFC may retain control and use the joint staff to direct and execute maritime operations.”

¹¹ Unfortunately, this discussion doesn’t address the potential for varying the structure/approach depending on the type of mission (e.g., where one is along the range of military operations).

logistic support; and planning.”¹² (p. II-5) Chapter 3 contains a detailed look at joint planning at the JFMCC HQ. It discusses planning considerations, organization, responsibilities, process and products. Appendices A through H provide guidance on the typical functions, responsibilities, organization, and planning processes for a JFMCC.

In summary, like its sister publications, JP 3-32 does a great job of providing doctrinal guidance as to how to form a functional component command, and it discusses the responsibilities, tasks, and processes the command headquarters will employ. But as in JP 3-30 and JP 3-31, the lesson to be drawn is that there is *one* way to approach command and control—the “standard” JFMCC command structure. Therefore, for the same reasons discussed earlier, JP 3-32 contains only limited applicability to the command and control of the future joint force envisioned in the CCJO. It describes only one approach.

4. JP 3-33, Joint Task Force Headquarters (31 July 2006)

JP 3-33 “provides joint doctrine for the formation and employment of a joint task force (JTF) headquarters to command and control joint operations.” (p. i) In this way it is similar to the other 3-30 series publications summarized above in that it describes the responsibilities, tasks, and processes of a operational-level command headquarters. JP 3-33 differs from the others, however, in that it does not purport to be applicable to only one type (i.e., one physical domain) of C2 organization; the doctrinal tenants outlined in JP 3-33 apply more universally.

Perhaps because it is a more recent publication, JP 3-33 better reflects the concepts presented and discussed in the CCJO than the other publications in the 3-30 series. For example, starting with chapter 1, which discusses the basics of a joint task force, the publication strongly admonishes the reader to apply the CCJO “characteristics” of adaptability and tailorability in the C2 structure and organization, specifically stating that the nature of the mission and the objectives to be accomplished are primary considerations in determining the actual command arrangements of and within any particular JTF:

JTFs may take many forms and sizes as they are employed across the range of military operations. The specific organization, staffing, and command

¹² Other than the first one, which is *the* function of the JFMCC, the rest are arguably the tasks conducted by the JFMCC and his staff in the course of commanding and controlling the force.

relationships will vary based on the mission assigned, the environment within which operations must be conducted, the makeup of existing and potential adversaries or nature of the crisis (e.g., flood, earthquake), and the time available to achieve the desired end state.” (p. I-4)

Continuing in this vein JP 3-33 states, “The CJTF should consider the establishment of C2 structures that take account of and provide coherence to the activities of all elements in the JOA. In addition to military operations, these structures should include the political, civil, administrative, legal, and humanitarian elements as well as NGOs, IGOs, and the media.” (p. I-8)

As support for this “requirement,” JP 3-33 places a deeper emphasis on interagency and multinational operations than do the other publications in the 3-30 series and points out that:

The unique aspects of the interagency, IGO, and NGO coordination process require the JTF HQ to be especially flexible, responsive, and cognizant [emphasis added] of the capabilities of US agencies, NGOs, the host nation (HN), other government agencies, and intergovernmental organizations (IGOs). The JTF must establish an organizational structure, processes, and procedures to fully consider interagency perspectives and positions into its planning, execution, and assessment process.¹³ (p. I-8)

Additionally, further reflecting the CCJO, the publication points out that “US-led JTFs should expect to participate as part of a multinational force, i.e., a coalition or alliance, in *most* [emphasis added] future military endeavors throughout the range of military operations...Such participation with MNFs may complicate normal unilateral organization, planning, and operations.” (p. I-9)

To its credit (whether by design or by default) JP 3-33 reflects one of the central ideas regarding command and control discussed by the DoD CCRP (also see chapter 6 of the present paper). Although it uses slightly different terminology, the publication discusses the “C2 Approach Space” from the viewpoint of the CJTF:

¹³ Chapter 4 elaborates further and includes an important caveat: “A coordinated and integrated effort between the JTF and other government agencies, NGOs, and IGOs is essential to achieve our national objectives, but should not be equated to the C2 of a military operation. Military operations depend upon a command structure that often is very different from that of civilian organizations. These differences may present significant challenges to coordination efforts. The various USG agencies’ different, and sometimes conflicting, goals, policies, procedures, and decision-making techniques make unity of effort a challenge. Still more difficult, some NGOs and IGOs may have policies that are explicitly antithetical to those of the USG, and particularly the US military.” p. IV-16. Also see JP 3-08, *Interagency, Intergovernmental Organization, and Nongovernmental Organization Coordination During Joint Operations*, for an in-depth discussion of interagency C2 considerations.

The CJTF is responsible for determining the basis on which JTF component and other subordinate commanders will exercise C2 and for clearly assigning responsibilities, delegating authorities [CCRP term “allocation of decision rights”], and establishing command relationships [CCRP term “patterns of interaction”]...The commander sets the tone for the entire command by setting priorities for information requirements and dissemination needs. The commander defines what information is needed and how it should be delivered [CCRP term “distribution of information”]. (pp. xv and xvii)

This said, JP 3-33 also contains several of the pitfalls highlighted earlier in the discussions of the other 3-30 series doctrine publications. Chapter 2, “Joint Task Force Headquarters Organization and Staffing,” contains a detailed discussion regarding how a JTF staff is formed and organized, and the nature of its processes and systems. It only implicitly addresses the concept of “alternative approaches to C2.” Although the basic composition of the C2 staff is important, the document lacks any discussion of the dimensions of C2 approaches as outlined by the CCRP. While it does present several options that may be used to form a JTF headquarters (HQ), it devolves into the current “standard”:

The *preferred option* [emphasis in original] is to form a JTF HQ around a pre-existing core HQ (such as a fleet, Air Force Warfighting HQ, Marine expeditionary force, or Army corps) that includes an established command structure or establish around a Service component HQ. In some cases, the CDR may designate the standing joint force headquarters as the core HQ element and augment it with additional Service functional experts. As a third option, a CDR may initially deploy a combatant command assessment team or like organization as the JTF core element.” (p. xii)

The publication does acknowledge that the JTF’s core staff generally may not have the required expertise to address all aspects of the mission. Consequently, *additional expertise and associated personnel will be required to augment the core staff.... The JTF mission is the most important factor in determining the type of augmentation the core staff should receive.*” [emphasis in original] (p. xii) One may question whether this organizational construct can actually allow the flexibility called for previously.

Furthermore, chapter 3, in discussing Joint Task Force Subordinate Commands, states, “Most often, joint forces are organized with a combination of Service and functional component commands and subordinate task forces with operational responsibilities. It specifically ‘requires’ the inclusion of Service component commands.” (p. III-2) This is ostensibly because “administrative and logistic support for joint forces is provided through Service component commands.” In any case, it is another example of

where current doctrine actually limits the ability of the commander to adapt and tailor the C2 approach.

Chapter 4 discusses detailed aspects of Joint Task Force command and control.¹⁴ This chapter describes eight critical factors that influence JTF C2:

1. JTF C2 information systems and information sharing
2. JTF information management activities
3. The role of the commander in the JTF C2
4. Command relationships [COCOM; OPCON; TACON; Supported/Supporting]
5. Operational area management
6. Rules of engagement (ROE) or rules for the use of force (RUF)
7. Interagency implications on JTF C2
8. Multinational implications on JTF C2.

Of these eight “critical factors,” only the first one, Information Systems and Information Sharing, is directly reflective of the thinking by the CCRP:

To employ these systems [that collect, process, store, display, and disseminate information...includes computers—hardware and software—and communications as well as policies and procedures for their use] effectively, the commander and staff must first determine how the HQ will collect, process, store, display, and disseminate information [emphasis added] (p. IV-1)

Chapters 5–10 detail the basic organization, roles, responsibilities, and tasks of the standard HQ staff directorates (J-1 through J-6) that form the basis of the doctrinal JTF C2 organization. Of note, chapters 6 and 10 (J2 and J6, respectively) contain in-depth discussions regarding directorate organization and functioning during operations with interagency and/or multinational participation.

5. Summary and Analysis

Although all three of the existing JP 3-series publications and draft publication JP 3-33 do a good job of detailing the structure, relationships, responsibilities, activities, and processes of current doctrinal joint force command and control elements, they all share a common “problem.” Together, they point out a major drawback of applying current C2

¹⁴ One may wonder why command and control is not covered until Chapter IV of a publication with “command and control” in the title, but that issue is beyond the scope of this paper.

doctrine to the issue of command and control of the joint force envisioned in the CCJO—they provide the JFC only an extremely limited opportunity to vary the approach to command and control. All of the documents state that the JFC can use one of several organizational variations, but they all focus almost exclusively on one approach—what they term “functional.” This approach is covered in detail, but the other options are not addressed beyond a short statement essentially stating that they exist.

Additionally, there is a problem with terminology itself. Although the documents purport to provide the doctrine for respective “functional component commands,” they are actually discussing component commands that are oriented toward “physical domain” (i.e., air, land, and sea). For example, air operations do not constitute a function; they are merely operations that are conducted in the air (or aerospace) domain. Examples of true functions are force application (or strike) and logistics (or sustainment). Equating physical domain with a function is not only misleading, it is—as pointed out in the C2 Joint Capabilities Document—unnecessarily limiting as an idea or approach around which to organize and conduct command and control.¹⁵

There is a corollary problem with equating functional component commands with physical domain. JP 3-32 points out that:

The maritime domain [is defined as] as “the oceans, seas, bays, estuaries, islands, coastal areas and the airspace above these, including the littorals.” Per Joint Publication (JP) 3-0, Joint Operations, “The littoral area contains two parts. First is the seaward area from the open ocean to the shore, which must be controlled to support operations ashore. Second is the landward area inland from the shore that can be supported and defended directly from the sea. (p. I-2)

A direct interpretation of this passage points to a potential conflict between the underlying premise of JP 3-32—command and control of maritime operations—and JP 3-30 (C2 of land ops) and JP 3-31 (C2 of air ops). According to doctrine, the component commander responsible for maritime operations (the functionally oriented JFMCC) has responsibility for and command and control over a portion of the physical domains of two other functional commanders (JFLCC and JFACC). In other words, by extending the definition of “maritime” to include the “landward area inland from the shore” and the “airspace above these,” doctrine as presented in JP3-32 allows the maritime functional component commander to exercise C2 not only in the physical

¹⁵ See appendix M of the C2 Joint Capabilities Document, Version 1, 10 November 2006, for a more detailed discussion of this issue.

domain of the “sea” but also on land and in the air, which according to the other publications are the exclusive purview of the JFLCC and the JFACC, respectively. Although this arrangement apparently has worked historically, it appears to be confusing.

In sum, all four of the subordinate-level publications reviewed generally reflect the “traditional” or “status quo” approach to C2, an approach that more than likely will not be universally applicable or desirable in the future operational environment. The lack of any “non-domain-oriented” doctrinal publications (the draft JP 3-33 notwithstanding) is also telling. As has been discovered during the course of researching several of the other subtasks of this IDA project, some (albeit minor) parts of DoD are increasingly looking at, among other things, the feasibility of functionally oriented and/or mission-oriented organizational structures for C2 of the joint force. (Neither of these constructs is specifically tied to a physical domain such as land or air.) While structure is only one part of the transformation of C2, new approaches to C2 are in essence what the CCJO is calling for; the doctrine community will need to change accordingly.

C. CONCLUSIONS

The task was to review and document current JC2 doctrine to determine whether it is adequate for the CCJO vision or provides insights for the CCJO. We have drawn two primary conclusions.

Conclusion 1. In some cases the kind of operations envisioned in the CCJO can probably be conducted successfully using the JC2 constructs described in current doctrine.

This conclusion refers to those cases in which the appropriate JC2 approach happens to match the relatively narrow range of possibilities covered by doctrine. It is readily apparent, however, that current doctrine does not adequately address the requirement that future joint force commanders be able to adapt and tailor their particular C2 approach to the exigencies of any particular mission. Although existing doctrine allows for alternative C2 approaches, it does only a very cursory job of describing them and providing usable details for a commander to draw upon. In fact, most of the doctrine labels such “alternative” structures and approaches as the “exception” rather than the “norm.”

An underlying theme of CCJO is the requirement for “collaboration” across the force. A senior participant during the recent JFCOM-sponsored experiment URBAN

RESOLVE 2015 said the following about using existing C2 tools and employing current C2 doctrine:

The lack of a collaborative environment reinforces component campaigns and inhibits the emergence of a joint JTF campaign. Absent easy collaboration, we fight land, separate from air, separate from sea... [Additionally], commander to commander interaction was conversational and less focused on deep discussions of operational issues. This is likely a function of the unlinked C2 tools and not the predisposition of the commanders.¹⁶

Later in the UR 2015 experiment, the introduction of new collaborative tools led the C2 element to “challenge the existing SJFHQ approach to prosecuting planning and [they] are developing new processes that bring components more directly into the planning process ... [to develop] a shared product that transforms the ‘shared products’ alignment from a focus on staff organization (e.g. J-3, J-5, J-35, etc alignment) to a focus on the elements of the mission. This revolutionary approach holds the potential to create collaborative space for all commanders and principle staff to collaborate on the JTFs position in accomplishing the assigned mission.”¹⁷

These observations indirectly highlight the limitations of current doctrine and systems on C2 staff functioning while also showing the power inherent in the CCJO force characteristic of a networked collaborative environment. Perhaps more importantly, they reinforce the notion that current doctrinal approaches to C2 are not optimal for the future.

Conclusion 2. With two exceptions, doctrine related to JC2 offers little in the way of insights for future versions of the CCJO.

One exception is that JP 6-0 appears to offer intriguing enablers for possible alternatives (e.g., flatter structures or more integration at lower levels). JP 6-0 seems open to the possibility of other ways of doing the JC2 task. The notion of network-enabled operations is consistent with the evolving CCRP theory that we develop in chapter 6 of the present document. The CCJO might leverage JP 6-0 thinking in describing future operations and the centrality of JC2 within the concept. However, we discuss in chapter 7 there are other concepts for future JC2 that are probably better sources of ideas for the CCJO than JP 6-0.

¹⁶ James ‘Pat’ O’Neal, *Report on Collaboration Issues in Urban Resolve Experiment (UR 2015) HITL 2*, 29 September, 2006, p. 5.

¹⁷ Ibid., pp. 4–5.

The second exception that offers insights for future JC2 is JP 3-33, which recognizes the importance of interagency and multinational operations in the future, and the “difficulties” associated with meshing command and control of DoD forces with other partners. The CCJO fully acknowledges the importance of these partners and makes “Unified Action” a cornerstone of the concept, but does not specifically label it a JC2 problem, which it clearly is.

IV. CURRENT OPERATIONS

We reviewed and documented JC2 approaches as reflected in current operations to determine if they are adequate for the CCJO vision and provide possible models of command and control of the future force.

Command and control is obviously an integral part of recent and ongoing operations. Within the framework of the task we conducted a review of the documentation regarding JC2 approaches for the following:

- Operation Iraqi Freedom (OIF)
- Operation Enduring Freedom (OEF)
- Combined Joint Task Force Horn of Africa (CJTF-HOA)
- Operation LIFELINE (Relief ops in the wake of the October 2005 earthquake in Pakistan)

For all four operations, we were specifically looking for examples that are “abnormal” (i.e., not doctrinally “pure”) across the range of military operations. Understanding not only where the differences are, but also why a “non-doctrinal” approach is or was employed is integral to understanding the relationship between current operations and the CCJO.

This chapter discusses the reviewed operations in a case study format. For each operation, a general overview of the C2 approach employed is first presented. Then, “differences and/or deviations” from the C2 approach outlined in current US military doctrine are highlighted and discussed, along with the relationship between these and the CCJO.

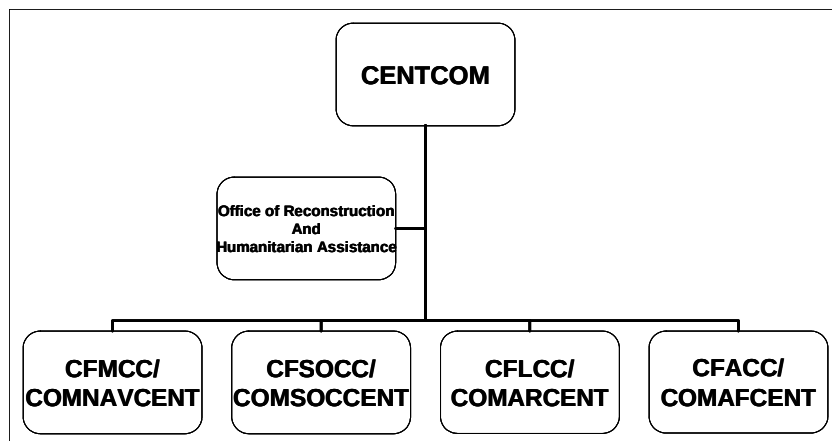
A. OPERATION IRAQI FREEDOM

1. C2 Approach

Many of the details concerning the command and control structure and approach employed by CENTCOM during OIF require special security handling. However, a few general comments are possible.¹

CENTCOM basically conducted the combat phase of OIF with a top-level C2 structure organized along functional lines. These functional components mirrored the physical domains of air, land, and sea. These components were structured and operated in near total accordance with current doctrinal guidance, specifically JP 3-30, JP 3-31, and JP 3-32.² There was also a separate component providing top-level C2 for special operations.

The basic structure of OIF C2 (as of March 2003) is reflected in figure 6.



Source: Adapted from http://orbat.com/site/agtwopen/iraq_c2_2003.pdf.

Figure 6. Basic Structure of OIF C2 (as of March 2003)

In terms of overall C2 approach, “special operations” was integrated with conventional operations to a degree not seen prior to OIF.

¹ *Joint Lessons Learned Operation Iraqi Freedom Major Combat Operations*, 1 March 2004. This JFCOM-produced report on joint lessons learned from the major combat operations phase of OIF discusses in great detail a large number of command and control issues, both positive and negative. In discussing this report, we therefore refer to OIF and OEF in the past tense. The reader is strongly encouraged to review the actual full report in order to gain a full appreciation of the details and nuances of the operation that can only be briefly highlighted here.

² See chapter 3 of the present publication for details on these three doctrinal publications.

A fairly new organizational construct employed was the establishment of a theater support command, responsible for theaterwide combat service support. Such a subordinate command is a fairly major break with the “standard” way joint operations have generally been conducted, although the doctrinal “approval” to conduct support in this manner is mentioned in JP 3-31, albeit only briefly.³

2. Applicability to CCJO

In discussing such specific issue areas as joint integration and adaptive planning, joint fires, and theater logistics, the JFCOM Lessons Learned document touches on various aspects of C2 throughout. Chapter 11 of the report focuses entirely on command and control, providing an in-depth look at 10 issues and capabilities that enable C2 of the force. While these issues vary from the more general to the more specific, several have direct applicability to and can be useful in informing the CCJO; others, although important in themselves, are below the “level” of the CCJO.

CCJO emphasizes the importance of integrated and interdependent operations by the joint force. OIF not only reflected this idea in regard to the force itself, it graphically illustrated the necessity of employing a proper and adaptable approach to command and control in order to successfully effect such operations.

Another key concept in the CCJO is *virtual reach*. OIF illustrated both the power of having such a capability and the affects on overall command and control if and when this capability is either missing or employed inefficiently.

3. Conclusions

Although many aspects of the C2 structure and approach used in OIF reinforce several of the concepts in the CCJO, OIF does not provide a good model of future C2. OIF did, however, use some innovative ideas, for example, the employment of innovative, task-organized units [and attendant C2] such as the Army’s elite Delta Force special missions unit working with a platoon of M1 Abrams main battle tanks and close air support. But to a large extent OIF C2 followed the standard doctrinal guidelines at the time. In fact, there was still a “segmentation of the battlespace that created unnatural

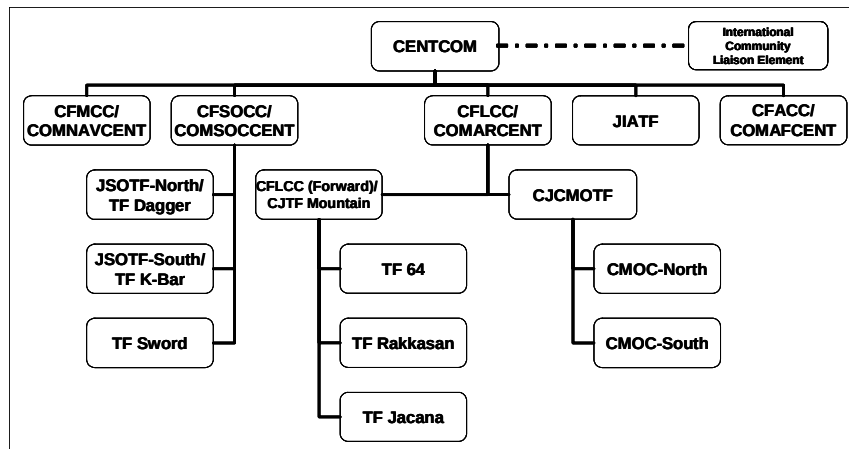
³ JP 3-31, *Command and Control for Joint Land Operations*, 23 March 2004, p. IV-14. “The supported commander determines if common servicing would be beneficial within the theater or designated area.”

seams, inhibiting the full potential of a joint force.”⁴ Where the C2 approach did touch on CCJO concepts, it reinforced their “correctness,” such as the importance of reach and knowledge, and illustrated the value of flexibility and adaptability in the command and control of the joint force. At the same time, several aspects of OIF (as highlighted in the classified Lessons Learned report) reveal gaps in current doctrine and the difficulties that can arise when applying the standard ways of doing business.

C. OPERATION ENDURING FREEDOM

1. C2 Approach

The C2 structure employed in the initial stages of OEF was a direct reflection of current joint C2 doctrine. The basic structure of OEF C2 (as of June 2002) is reflected in figure 7.



Source: Adapted from Johann Price, “Operation Enduring Freedom: Commands and HQs June 1, 2002,” Order of Battle, 23 June 2002, <http://orbat.com/site/agtwopen/oef.html>.

Figure 7. Basic Structure of OEF C2 (as of June 2002)

In keeping with the doctrinal approach outlined in the JP 3-30 series, the primary component commands were organized along so-called functional lines that in reality were actually physical domains. In other words, the domains of land, sea, and air were the prime delineators for three of the four component commands. These component commands essentially reflected each of the services. Although the fourth component command, special operations, was arguably more truly “functional” than domain-related,

⁴ Adapted from Michael P. Noonan and Mark R. Lewis, “Conquering the Elements: Thoughts on Joint Force (Re)Organization,” *Parameters*, Autumn 2003, pp. 31–45.

it was also essentially “Service-centric,” in this case Special Operations Command. The one truly functional component of the upper-level OEF C2 structure was the Joint Interagency Task Force. This component, containing field representatives from every major civilian agency (including intelligence and law enforcement) and military force involved in the operation, was not an actual C2 element but rather a “coordinating body” which performed liaison functions. A major part of the JIATF function was intelligence sharing and fusion. In CJCS General Myers words, “The mission of this task force is to help integrate the actions of their respective organizations into one cohesive war effort.”⁵

Below the component level, all ground and special operations forces were organized into subordinate task forces that answered to either the Combined Forces Special Operations Component Commander (CFSOCC) or the Combined Forces Land Component Commander (Forward) (CFLCC(F)). The three Special Operations Task Forces had a separate chain of command, but in many cases their operations were in support of the Combined Forces Land Component Commander’s (CFLCC) mission and therefore came under CFLCC(F) operational control. Task Force 64 was organized under the CFLCC (F) to provide an administrative command structure to interface with all non-UK/US special forces and smaller ground combat forces provided by various national governments and under American operational control. Detachments of various sizes from TF 64 were placed under the operational command of other fielded Task Forces for varying periods of time depending on their needs.

The Coalition Joint Civil-Military Operations Task Force (CJCMOTF) was responsible for planning, coordinating, and in many cases executing Coalition humanitarian operations in Afghanistan.

Most contributing nations maintained a liaison element at CENTCOM headquarters. The degree of involvement in the planning process depended on the nation and the importance of its contribution.

2. Applicability to CCJO

A central idea of the CCJO is that the future force will be required to conduct integrated and interdependent operations. This in turn requires a C2 approach that allows for such operations to occur. OEF did provide instances that reflect (by default if not by

⁵ Price, “Operation Enduring Freedom.”

design) this CCJO supporting idea. The OEF structure shown in the wiring diagram clearly illustrates that the chain of decision making was separated, both geographically and functionally. As the diagram shows, the connection between commanders occurred at the Joint Force Commander level. There were some staff interactions at various headquarters below the component command level, but those were generally coordination linkages only. Seldom did the commanders at the operational and higher tactical level orchestrating the fighting in the various physical domains actually interact.⁶

3. Conclusions

Certain aspects of the command and control approach seen in OEF reflect and reinforce portions of the CCJO. However, as was the case with OIF, some innovative ideas were used, but in general command and control in OEF followed the standard doctrinal guidelines at the time.

D. COMBINED JOINT TASK FORCE – HORN OF AFRICA

1. C2 Approach

CJTF-HOA was formed in the fall of 2002. It consists of more than 1,500 people, with an area of responsibility that includes the countries of Djibouti, Ethiopia, Eritrea, Kenya, Seychelles, Somalia, Sudan, and Yemen. As part of the broader global war on terrorism, the specific mission of the task force is to “work to prevent conflict, promote regional stability, and protect Coalition interests in east Africa and Yemen through humanitarian assistance, disaster relief, consequence management, [and] civic action programs to include medical and veterinary care, school and medical clinic construction, and water development projects.”⁷

Compared with most DoD operations, CJTF-HOA is perhaps unique in that its efforts “are being expended in a pre-conflict, capacity-building security environment, and not in a post-conflict, reconstruction security environment.”⁸ Among other things, this uniqueness, plus the general nature of its operating environment (containing a large

⁶ For an in-depth look at how segmenting C2 affected operations in OEF, see Sean Naylor, *Not A Good Day to Die - The Untold Story of Operation Anaconda*, Penguin Group (USA), New York, 2005.

⁷ <http://www.hoa.centcom.mil> (15 January 2007).

⁸ “Achieving Unity of Effort: A Case Study in the Horn of Africa.” Institute for Defense Analyses Joint Advanced Warfighting Program Technical Review Draft, August 2006, p. 1.

number of diverse US and international actors, both private and government), requires the task force to apply an equally unique combination of flexibility and adaptability in its approach to command and control.⁹

The task force's command and control structure reflects the requirement to coordinate the application of national (and international) power by the many agencies involved in its operating environment. The headquarters was initiated with about 400 members representing all US armed services, civilian personnel, and coalition force representatives. Initially operating aboard the USS Mount Whitney in the Gulf of Aden, the headquarters moved its operation to Camp Lemonier in Djibouti in the spring of 2003.

2. Applicability to CCJO

The review of CJTF-HOA operations indicated several disconnects with the CCJO. First, unified action and unity of effort are integral components of the CCJO. Obviously, unity requires orchestration among all the instruments of national power wielded by many different US agencies. Such orchestration would be an essential function of command and control. However, a 2006 study conducted by IDA concluded: "Competing conceptualizations of the war (regarding the nature of both the threat and the response) prevent effective orchestration of the instruments of power."¹⁰ The study also noted that while integration and synchronization between agencies is fairly good and has improved in some areas over the past several years, "much of this has to do with personalities."¹¹ Presuming that 'integration and synchronization' are key functions of C2, it appears the C2 approach utilized by the CJTF-HOA Commander, as dictated by current doctrine, is inadequate to overcome competing conceptualizations and enable or result in a high degree of "unity".¹² A reliance on person-to-person contacts to overcome

⁹ See Combined Joint Task Force-Horn of Africa (CJTF-HOA) Initial Impressions Report, Center for Army Lessons Learned, October 2004, No. 04-28, pp. 95–104, especially p. 102, for further detail regarding C2.

¹⁰ "Achieving Unity of Effort," p. 6. An unpublished study by IDA in 2004 on interagency operations and the global war on terrorism concluded that there is no useful shared conception of the conflict among the numerous US Government agencies. The 2006 study reaffirmed this condition.

¹¹ Ibid, p. 7.

¹² The IDA study reinforces this notion. It mentions a potential approach to alleviate the integration/synchronization shortfall, but quickly discounts it by determining it to be "bureaucratically infeasible" [read: "doctrinally incompatible"]. p. 14.

an apparent flaw (or gap) in doctrine is not a sound military principle. Simply stating the requirement for “unified action” and “unity of effort” is not necessarily the same as making unity a reality.

Second, the experiences of CJTF-HOA point out two additional issues with operationalizing the CCJO. Although CCJO deems unity a top priority, the IDA HOA case study found that in the absence of national-level policy that proscribes the process of orchestration and that assigns roles and missions to the various agencies, “each agency is finding its own ways,” resulting at times in instances where “agencies are in conflict over ends, ways and means.”¹³ This situation illustrates the importance of having the ability to tailor C2 in order to integrate the joint force with the other elements of national power.

Additionally, current doctrinal guidance regarding procedures for handling and disseminating information are at odds with several of the main precepts of the CCJO. The IDA study found that barriers to sharing information inhibit coordination across boundaries with allies, other government agencies, etc.¹⁴ Clearly, current doctrinal C2 as reflected in the CJTF-HOA is not directly supportive of the CCJO’s emphasis on knowledge or the supporting idea of integrated operations.

Part of the improvements to interagency coordination over the past several years can be attributed to assigning liaison officers from non-DoD agencies to the Task Force Headquarters and CJTF liaison officers to the several embassies in the region. This is in keeping with current doctrine (see JP 3-33, for example) but is not entirely congruent with CCJO. Liaison officers by definition lack decision-making or resource commitment authority, which is in the purview of command and control. Once again, the CJTF-HOA does not provide an effective model for CCJO-based C2.

Planning is one of the overall success stories of the CJTF-HOA. However, this important function of C2 neither encompasses nor reflects CCJO ideas, particularly unity of effort. Within the CJTF, “Each agency plans separately, plans for different purposes, plans according to different authorities, and plans to achieve effects in different time frames.”¹⁵ Although the CCJO is written with a view of the joint (i.e., military) force, command and control of this force is implied to be carried out in a much broader

¹³ Ibid., p. 7.

¹⁴ Ibid., p. 8.

¹⁵ Ibid., p. 16.

diplomatic, information, military, and economic (DIME) environment. A model where each component of DIME plans separately is obviously not optimal.

3. Conclusions

As it currently operates, CJTF-HOA does not provide a clear model of command and control that would be useful for the future force described in the CCJO. However, the foregoing discussion vividly illustrates both the necessity to realize the concepts in the CCJO and the potential difficulties in doing so. The CCJO must accommodate situations such as faced by CJTF-HOA and facilitate the highest degree of unified action possible.

E. PAKISTAN RELIEF

1. C2 Approach

In operation from 9 October 2005 to the end of March 2006, the Combined Disaster Assistance Center (CDAC-PAK) was the hub for all US relief efforts following the major earthquake that struck northern Pakistan in October 2005. Command and control was provided by elements of Expeditionary Strike Group 1, initial portions of which arrived on the second day following the quake. This group was quickly augmented with a Standing Joint Force Headquarters.¹⁶

CDAC-PAK was under the operational control of Combined Forces Command Afghanistan (CFC-A), with Navy Central Command providing administrative control. The CDAC had OPCON of six subordinate units that encompassed airlift, medical, logistics and construction functions. The CDAC gave four of these commanders area responsibilities for ensuring the administrative, operational, logistical, and force protection requirements of US forces. The CDAC was given “Direct Liaison Authority” with the US Office of Defense Representative Pakistan and had close coordination requirements with the US Embassy, USAID, the Government of Pakistan, and myriad organizations from the international community. The basic structure of the CDAC is depicted in 8.

¹⁶ The following information is drawn from a briefing titled “Humanitarian Assistance / Disaster relief in Pakistan,” Joint Center for Operational Analysis, 31 October 2006. The briefing is caveated FOUO. In order to avoid this caveat, parts of the information presented here have been made “generic.”

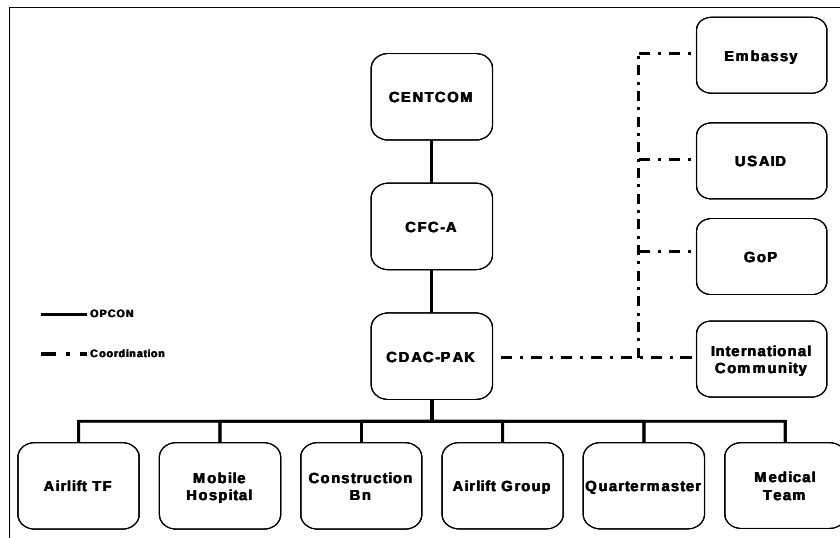


Figure 8. Basic Structure of the CDAC

The CDAC Commander’s Intent made it very clear that the role of DoD was “*supporting*” and entailed a very large (and potentially sensitive) degree of coordination [not command] with a very large number of partners. In fact, CDAC was only one of 12 major organizational groups supporting the Pakistan government’s Federal Relief Commission.

2. Applicability to CCJO

CCJO labels “knowledge” as a fundamental action of the joint force. It is central to command and control. A major problem in this area was digital information sharing with the host nation and other international organizations. Such sharing was inhibited by incompatible procedures and networks, both internal and external to the CDAC, as well as differing security rules and procedures among the various public and private US and international organizations. This essentially locked large amounts of information in a relatively limited number of hands and contributed to a general lack of universal knowledge.

CDAC’s requirement to coordinate among the various participants in the overall relief effort was an enormous task. Rescue and medical personnel came from 32 countries, and over 150 organizations (the UN and other nongovernmental, international, and private organizations) were operating at various times during the operation. The primary means to effect this coordination was use of US military liaison officers (LNOs) with the Pakistan military and the numerous other organizations. Current doctrine, such

as presented in JP 3-33, discusses the value of LNOs to the command and control function. The case can be made that using LNOs as needed in any particular situation supports the call for “tailorability” made in the CCJO. However, this is only a limited application of a CCJO concept to an operation and demonstrates only a fraction of the implications of the CCJO.

3. Conclusions

The humanitarian relief operation in Pakistan illustrates and reinforces the value of the CCJO in highlighting the importance of knowledge to the command and control of the future force. It also reinforces the concept and importance of integrated and interdependent actions presented in the CCJO, while also illustrating the potential difficulty of making this CCJO idea a reality. Overall, while there is some utility in using the CDAC-PAK approach to C2 as an illustration of future command and control as envisioned by the CCJO, there are also many limitations.

F. OVERALL CONCLUSIONS

A review of the command and control approaches employed in recent and ongoing operations was conducted in order to determine their potential relevancy and applicability to the CCJO. In general, the review showed that none of the operations provide a model of C2 adequate for the command and control of the future force. While there are minor variances between the individual operations, they all appear to be fairly tightly reflective of current doctrine and the “traditional” approach to C2 (including structurally). A careful read of the operations, however, and one which focuses on the “shortfalls” or “problems/hindrances” encountered during the operations, reinforces one of the underlying rationales for publishing a document such as the CCJO—to get the wider DoD audience thinking about issues that need to be addressed regarding C2 of the future force.

These case studies together illustrate the central basis of the CCJO: the wide range of military operations that most likely will be encountered in the future—major combat operations, humanitarian assistance in a crisis situation, long-term engagement, and shaping activities. None of the four cases directly employed a C2 approach using the concepts and ideas enumerated in the CCJO. However, all four reinforce them, not by direct application but by pointing out the shortcomings of how C2 of the joint force is

currently conducted based on current doctrine and practice (i.e., in the absence of a full and coherent application of the concepts and ideas of the CCJO).

Unfortunately, the CCJO as currently written does not address command and control to the necessary extent. If the problems and issues encountered by the joint force in dealing with the future operating environment, as these four operations illustrate, are to be countered successfully, it is incumbent on the CCJO to be absolutely clear about its vision for better C2 in the future.

V. UJTL, MSFD SCENARIOS, AND WARGAMES

We reviewed and documented other sources of ideas about future JC2, including the Universal Joint Task List (UJTL), Multi-Service Force Deployment (MSFD) scenarios, and selected recent Joint and Service Title 10 Wargames and experiments. Our objectives were to determine whether they were relevant and adequate and adequate for the JC2 tasks stated and implied in the CCJO and to gain potential insights that might inform future concepts.

A. UJTL

The Universal Joint Task List (CJCSM 3500.04D) contains a comprehensive hierarchical listing of the tasks, in a common language, that can be performed by the Joint Staff, Services, combatant commands and components, activities, joint organizations, and combat support agencies (CSAs) responsive to the Chairman of the Joint Chiefs of Staff. This task list describes, in broad terms, the current and potential capabilities of the Armed Forces of the United States and is intended to serve as the foundation for capabilities-based planning across the range of military operations.

The hierarchy of tasks found in the UJTL is divided into a series of broad functional task areas.¹ One of these areas is command and control. Although it does not discuss command and control explicitly, the CCJO nevertheless contains implications for command and control of the future force. The tasks reflected in the C2 functional area of the UJTL should reflect the requirements of current doctrine. The question is whether they might also be compatible with or inform the CCJO-defined (explicitly or implicitly) command and control approach.

To determine the adequacy of the C2 tasks found in the UJTL in relation to the tasks stated and implied in the CCJO, it is first necessary to characterize what is in the CCJO. As noted earlier in chapter 2, the CCJO contains no explicit reference to C2. Consequently, a direct comparison is difficult at best. Nevertheless, any C2 organization, whether in the current force or in the future CCJO-defined force, must fulfill certain functions; each function is accomplished through the completion of a set of appropriate

¹ These functional task areas are denoted with single-digit listings (e.g., SN 1, ST 1, OP 1 and TA 1, etc.). See appendix A for the entire listing.

tasks. Therefore, the adequacy of the current UJTL for the CCJO vision can be assessed by analyzing the functions (and by extension, the tasks) the CCJO-defined C2 approach must accomplish.

Although there may not be universal agreement on the specific details of command and control functions, a good starting point is the list provided by DoD's Command and Control Research Program (CCRP). As discussed in the CCRP publication *Understanding Command and Control*,² there are seven basic functions that any C2 element should perform:

- Establishing intent (the goal or objective)
- Determining roles, responsibilities, and relationships
- Establishing rules and constraints (schedules, etc.)
- Monitoring and assessing the situation and progress
- Inspiring, motivating, and engendering trust
- Training and education
- Provisioning

A secondary comparison can be made using the eight “capabilities” outlined in the C2 Joint Integrating Concept (JIC):³

- Exercise Command Leadership
- Establish/Adapt Command Structures and Enable Both Global and Regional Collaboration
- Develop and Maintain Shared Situational Awareness and Understanding
- Communicate Commander's Intent and Guidance
- Plan Collaboratively
- Synchronize Execution Across All Domains
- Monitor Execution, Assess Effects and Adapt Operations
- Leverage Mission Partners

² David S. Alberts and Richard E. Hayes, *Understanding Command and Control*, DoD CCRP Publications (2006), pp. 34–36.

³ *Command and Control Joint Integrating Concept Final Version 1.0*, 1 Sep 2005, p. 5.

The UJTL lists eight operational-level tasks that the C2 element must perform:

- Acquire and communicate operational-level information and maintain status
- Assess the operational situation
- Prepare plans and orders
- Command subordinate operational forces
 - Approve plans and orders
 - Issue plans and orders
 - Provide rules of engagement
 - Synchronize and integrate operations
 - Coordinate/integrate components, theater, and other support
 - Conduct operational rehearsals
- Establish, organize, and operate a joint force headquarters
- Coordinate operational information operations (IO)
- Coordinate and integrate joint/multinational and interagency support
- Provide public affairs in the joint operations area

If one presumes that the same functions must be performed by the C2 element of the future force as outlined in the CCJO and as reflected in the supporting JIC, then the tasks listed in the UJTL logically should match these functions. Comparing the lists above indicate that although there is some overlap (depending on one's interpretation), the two lists are not a good match. The conclusion to be drawn is that the UJTL, in its current form and content, is not directly applicable to the CCJO and therefore is an inadequate representation of the C2 tasks that will be required in the future.

This is not to say the UJTL is “wrong”; it is written to indicate the tasks associated with command and control as currently understood and practiced. As the CCJO evolves (and alongside it, the C2 JIC), the UJTL should be updated to reflect the tasks as described in those two documents.

B. MSFD

The Multi-Service Force Deployment documents are expanded versions of Defense Planning Scenarios (DPS) which provide detail necessary for building databases

for campaign-level analysis.⁴ MSFD development is conducted in close coordination with DPS development: content elements and process steps generally mirror DPS content elements and process steps, but at a greater level of detail. One major difference between the two is that each MSFD contains detailed information regarding the allocation of forces to the particular scenario to which it is related, while DPSs do not contain force allocations.

Because of the nature of the MSFDs and their use within the larger DoD Analytic Agenda, we reviewed a number of MSFD documents to determine their respective treatment of joint command and control in specific scenario-based contexts.⁵ The documents reviewed are listed in appendix C.

Each of the documents contained at least a rudimentary discussion of C2 within the larger discussion of CONOPS, sometimes under the heading of “command structure” and sometimes “command relationships.” The majority contained a cursory discussion of “requirements,” but generally, little was said regarding C2 beyond a wiring diagram and a one- or two-paragraph discussion of relationships between first-level subordinate C2 elements. All the MSFDs essentially discussed C2 utilizing “traditional” subordinate service-oriented component commands (CJFLCC, CJFACC, CJFMCC, etc.).

There is one very obvious exception to this general statement.⁶ This MSFD differs from the others in two primary ways. First, the discussion on C2 is longer and more detailed, although it still is not quite a full page. It basically covers the first and second tier command structure, highlighting the relationships among subordinate JTFs, both “geographic (e.g., North, South) and “functional” (e.g., theater-strike, sustainment), as well as with the other combatant commands that are in direct support. The C2 structure outlined does not contain the “traditional” Service component commands. The discussion points out that commanders at all levels can tailor their C2 assets as they deem necessary.

⁴ The DPS are part of SecDef guidance to the Department on capabilities development planning and programming. Each DPS depicts a specific hypothetical operational challenge that might be faced by the future force. Together, all DPSs are meant to address a full range of major military operations.

⁵ The purpose of the Analytic Agenda is to “institute a comprehensive and systematic process to provide data for strategic analyses, using approved scenarios and ensuring that data are available, easily accessible, integrated, pedigreed, sufficiently detailed, and synchronized with Planning, Programming, and Budgeting System cycles.” (DoDD 8260.1, Data Collection, Development, and Management in Support of Strategic Analysis, 6 December 2002, 4.1).

⁶ See Scenario Data: Major Combat Operations – 1. Win Decisively, Long-Range, Multi-Service Force Deployment; Vol I; Illustrative Theater Operational Construct; 9 April 05. DOD-1540-3837-05.

In discussing the responsibilities of the upper-level C2 organizations (subordinate JTFs) the document highlights some key attributes of the C2 structure that read nearly as if they had been lifted directly from the CCJO.

Second, and perhaps most intriguing, this MSFD has a six-page section titled “Key Variations” that briefly outlines five alternative C2 structures. For each alternative structure there is a graphical representation and a list of the primary attributes or focus. The lead-in paragraph that presents the motivation for the discussion is classified, but it essentially acknowledges the future operating environment and reflects the characteristics of the future joint force as described and discussed in the CCJO.

All five of the alternatives take a primarily functional and/or geographical approach to the upper-level command and control structure of the joint force. None of the alternative command structures focus on domain” (i.e., air, land, and sea), and only in two are the Services present with a component command headquarters.⁷

According to one of the participants in the MSFD process, this discussion on alternative structures was included for two reasons. The time frame of this document, 2024, allowed the writers more leeway in exploring and discussing alternative approaches to C2; they were not limited to the approach outlined in current doctrine that perhaps restricts the other MSFDs that are more near-term. Second, several of the authors were adamant about the need to look at possible alternative approaches for commanding and controlling the future joint force and were able to embed this idea into the document.

It is noteworthy that the MSFDs are not intended to be predict the future, or in the context of this paper, to predict future C2 approaches. Rather, they are designed to be source documents that provide standardized information with regard to both the scenario and force structure for joint analyses intended to inform future planning and priorities for concept development and experimentation. It is not surprising, then, that their individual treatment of command and control is limited.

⁷ The absence of Service Component Commands in several of the alternative C2 structures makes a direct break with current C2 doctrine, which states: “All joint forces include Service component commands because administrative and logistic support for joint forces is provided through Service component commands.” See Joint Publication (JP) 3-33, *Joint Task Force Headquarters*, Revision Final Coordination, 31 July 2006, p. xiii.

C. JOINT AND TITLE X WARGAMES AND EXPERIMENTS

“Experimentation is the gathering and examining of data in order to draw conclusions.”⁸ According to CJCSI 3010.02B, *Joint Operations Concepts Development Process*, and in the context of this paper, the purpose of experimentation is to help refine existing concepts, to identify new concepts, and to glean recommendations for changes in DOTMLPF and policy that are required to achieve significant advances in future joint operational capabilities.

Several DoD documents provide guidance and direction regarding experimentation and the CCJO. CM-0142-06 directs USJFCOM to “plan, design, execute and assess a relevant and credible joint warfighting experimentation program on concepts, capabilities, and prototypes derived primarily from the Joint Operations Concepts (JOpsC) family.”⁹ Appendix D to CJCSI 3010.02B, *Joint Operations Concepts Development Process*, provides an in-depth discussion of the relationship between “experimentation” and the CCJO and specifically directs “JOpsC family concept authors” [to] “coordinate experimentation with USJFCOM on approved concepts.”¹⁰ Finally, the *Joint Concept Development Experimentation Campaign Plan (Joint CDE CPLAN) 2006-2013 Annual Report to Congress (Draft)* (8 February 2006) specifically delineates the linkage between the CCJO and joint warfighting experimentation, and again tasks the authors of current JOpsC family concepts or emerging joint concepts to develop and coordinate concept-specific experimentation plans with USJFCOM, Joint Experimentation Directorate (J9):

*The JOpsC family of concepts represents the basis of a credible joint warfighting experimentation program over the next several years. ... To ensure the key issues and capabilities identified in concepts are being adequately explored, joint concept authors of current JOpsC family concepts or emerging joint concepts will develop and coordinate concept specific experimentation plans with USJFCOM, Joint Experimentation Directorate (J9). ... A refined CCJO and its associated family of concepts and improved joint warfighting capabilities are a key output of joint warfighting experimentation.”*¹¹ [emphasis added].

⁸ CJCSI 3010.02B *Joint Operations Concepts Development Process* (JOpsC-DP), 27 January 2006. Enclosure D, p. D-1.

⁹ CJCS memorandum CM-0142-06, 9 January 2006.

¹⁰ CJCSI 3010.02B *Joint Operations Concepts Development Process* (JOpsC-DP), 27 January 2006. Enclosure D, p. D-1.

¹¹ *Joint Concept Development Experimentation Campaign Plan (Joint CDE CPLAN) 2006-2013 Annual Report to Congress (Draft)*, 8 February 2006.

Given this very specific guidance, a high degree of correlation between experimentation and the CCJO should be evident. However, this is not exactly the case. The problem starts, perhaps with the nature of the CCJO itself. Written at a fairly high level of abstraction, the concepts and ideas espoused in the CCJO do not readily lend themselves to experimentation. This was seen as part of a separate task being conducted for J7 JETCD where several recent USJFCOM-sponsored experiments were reviewed for their overall applicability to the CCJO and their congruence with the CCJO ideas and concepts.¹² The experiments reviewed were GLOBAL DETERRENCE, UNIFIED QUEST 2006, URBAN RESOLVE 2015, JOINT URBAN WARRIOR 2006, and UNIFIED ENGAGEMENT 2006.¹³

In a general sense, all of the experiments, to varying degrees of fidelity, support the overarching concepts and ideas outlined in the CCJO. None of them found particular aspects of the CCJO to be “wrong.” Indeed, all three appear to have accepted CCJO as a statement of fact. The implied assumption regarding the CCJO was: ‘Its ideas are valid; let’s see what tools, organizations and processes we can develop that will help DoD achieve the CCJO ideas.’ In other words, the experiments didn’t examine the ideas of the CCJO itself to see if they were indeed “correct.” In this vein, all five experiments determined that the CCJO has problems of omission, but not of commission. They didn’t find anything substantively “wrong” with the CCJO ideas but intimate that several of the ideas perhaps should be weighted more heavily or the discussion expanded because of their importance to the operation of the future joint force.

One of the primary sins of omission that the experiments indirectly pointed out regarded the issue of command and control. Although the broad topic of command and control of the joint force was addressed to some degree in all the experiments, both explicitly and implicitly, C2 was a primary emphasis item in UNIFIED QUEST 2006 and URBAN RESOLVE 2015. The applicable insights from these two experiments are excerpted and discussed below.

¹² IDA Task AJ-6-2659, Capstone Concept Analysis.

¹³ See appendix C of the present document for a short synopsis of the experiments.

1. UNIFIED QUEST 2006

a. Insights from the Experiment Report

- Existing planning procedures, tools, and systems do not adequately support irregular warfare. Legacy processes can actually inhibit success.
- Irregular warfare, stability operations, and interagency actions present challenges for campaign planning in complex environments that traditional planning tools do not completely or adequately address.
- Civilian IA [interagency organizations] do not have a standardized decision-making, planning, or execution process...There are major structural and conceptual mismatches between all (IA) organizations that need to be solved.
- Terrorists and transnational spoilers [can] respond or act at an advantage over the three level C2 structure used by the US military and Interagency.
- Determine IA support needed on the battlefield and institutionalize IA planning capabilities...Develop the capability to tailor IA involvement.
- Current mechanisms and structures to generate and integrate...are lacking.

b. IDA Analysis

The draft final report for this experiment asserts, “Our adversaries approach Irregular Warfare without rules which juxtapose with ours -- adversary is not bound by process, structure, hierarchy or timelines...”¹⁴ Adversaries have an inherent advantage over the US military’s current processes, which by nature or design are much more structured and rigid and generally don’t reflect the peculiar dynamics and requirements of future operations. The experiment determined unequivocally that the level of joint, interagency, and multinational interdependence that will result in unified action as called for in the CCJO is totally dependent on command and control structures, processes, and tools that both include and are common to all participants.

¹⁴ US Joint Forces Command/J9, UNIFIED QUEST 2006 Draft Final Report, Version 3.0, 24 May 2006, Appendix D, p. 1.

2. URBAN RESOLVE 2015

a. Insights from the Experiment Report

- Using a future C2 system termed “JCPOF” the joint commander enjoyed a reduced decision cycle that enabled him to stay ahead of an asymmetric threat’s actions. It allowed the commander to accurately synchronize executable tasks and effects in rapid manner with all Components and also measurably improved Component to Component Commander collaboration and decision making.
- Intelligence should be looked at as a line of operation vice staff function.
- Multi-disciplined teams, organized horizontally enable integrated battle command.
- Achieving speed and fidelity requires the integration of sensors, analytical tools and subject matter experts into the C2 “system of systems.”

b. IDA Analysis

Three general comments are warranted. First, while the insights listed above reflect the fact the experiments were not conducted to directly inform the higher-level concepts of the CCJO, C2-relevant conclusions can be drawn. Second, URBAN RESOLVE 2015 specifically addressed tools that enable or enhance C2. However, the resultant tool-related insights are at a level below that of the CCJO. Third, and perhaps most important, several of the insights reinforce the underlying, albeit unstated, command and control concepts in the CCJO.

The fact that the CCJO does not directly address the topic of command and control is important to reiterate. It makes it very difficult for experiment planners to design experiments and develop objectives to inform an aspect of the CCJO that is “missing.”

A nearly singular focus on “C2 tools and/or processes” vice the CCJO itself is also evident in the content of the *Concept Development and Experimentation Campaign Plan*. This document is geared to “synchronizing DOD efforts across all phases of experimentation” by providing a “comprehensive and timely record of Enterprise Warfighter Challenges (WFC), activities and solutions.”¹⁵ The draft 2006–2007 plan lists 254 such WFCs. A large number of them either directly or indirectly concern or are

¹⁵ *Concept Development and Experimentation Campaign Plan* (draft) 2006–2007, p. X-2.

associated with command and control. However, based on a review of the descriptions in the document, all—or nearly all—are focused on some sort of technical solution/system to provide or improve C2 tool sets¹⁶ or are at such a high level of abstraction that they provide little opportunity for direct comparison with CCJO “requirements.”¹⁷ Written in this manner, the WFCs provide little assistance to a planner wanting to include CCJO-level C2 issues in an experiment.

D. CONCLUSIONS

The task was to review the Universal Joint Task List, Multi-Service Force Deployment documents, and selected wargames and experiments to determine the congruence with or applicability to the command and control aspects of the CCJO. By their nature, neither the UJTL nor the MSFDs are useful to compare with the CCJO. This is not a fault of the documents, as they are quite simply designed to reflect “current” processes and thinking within DoD vice looking toward the future and how the future force will or must operate. Experimentation, on the other hand, is designed to inform the future and therefore has great potential to inform the CCJO. However, the experimentation process seems focused more on C2 “enablers” (either in the form of technology-based systems or organizational constructs and processes) designed to enhance the exercise of command and control rather than on the underlying ideas of the CCJO. In fact, recent experiments seem to take the CCJO “as a given” and are geared not to inform the CCJO but to “operationalize” it.

Overall, the review of the documents and activities discussed here highlights the need for the CCJO to more clearly articulate the command and control aspects that will be required of the future force, to inform both future iterations of the UJTL and the planning and conduct of wargames and experiments.

¹⁶ For example, regarding over-the-horizon BLOS C2 the report says, “The JFC requires the capability for a robust and resilient C2 network ... that will connect commanders with distributed units and provide connectivity throughout the force” Regarding flexible crisis response C2 it makes reference to “technology/processes for dissemination of C2 information.”

¹⁷ For example, regarding flexible crisis response C2 the report also says, “The JFC requires unambiguous command relationships.” Regarding C2 requirements in support of strategic missions it says, “The JFC requires the capability to plan, coordinate, execute, and assess effects ...”).

VI. ADVANCED C2 THEORETICAL RESEARCH

We reviewed two recent theoretical works to assess their consistency with the current CCJO and to glean potential insights for future iterations of the CCJO. The review examined the OSD Command and Control Research Program (CCRP) and the January 2006 NATO Studies, Analysis and Simulation 050 Panel (SAS 050) final report entitled *Exploring New Command and Control Concepts and Capabilities*.

We concluded that the theoretical work done by the contributors to the CCRP which strongly influenced SAS 050 definitely offers a potentially useful framework for evaluating JC2 coverage in the CCJO. The CCRP has published a series of books—the most recent of which is *Understanding Command and Control* by David S. Alberts and Richard E. Hayes—and papers exploring in detail the issue of C2 in the Information Age. Key elements of the CCRP C2 vision should be informative when compared with the CCJO and subordinate JC2 documents to see whether they are consistent.

Section A provides a very brief description of the CCRP work, which began with the definitions outlined earlier. The key ideas of the CCRP and related foundational work lay out the theory for the full range of C2 approach possibilities possible in 15 to 20 years. The fundamental joint actions and several characteristics of the joint force envisioned in the CCJO are very much a function of and dependent upon the C2 approach options available to a commander. The CCRP work describes the theoretical underpinnings for a future JC2 capability that would maximize knowledge empowerment, interoperability, flexibility, agility, tailorability, and resiliency of both JC2 and the joint force as a whole.

A. CCRP WORK

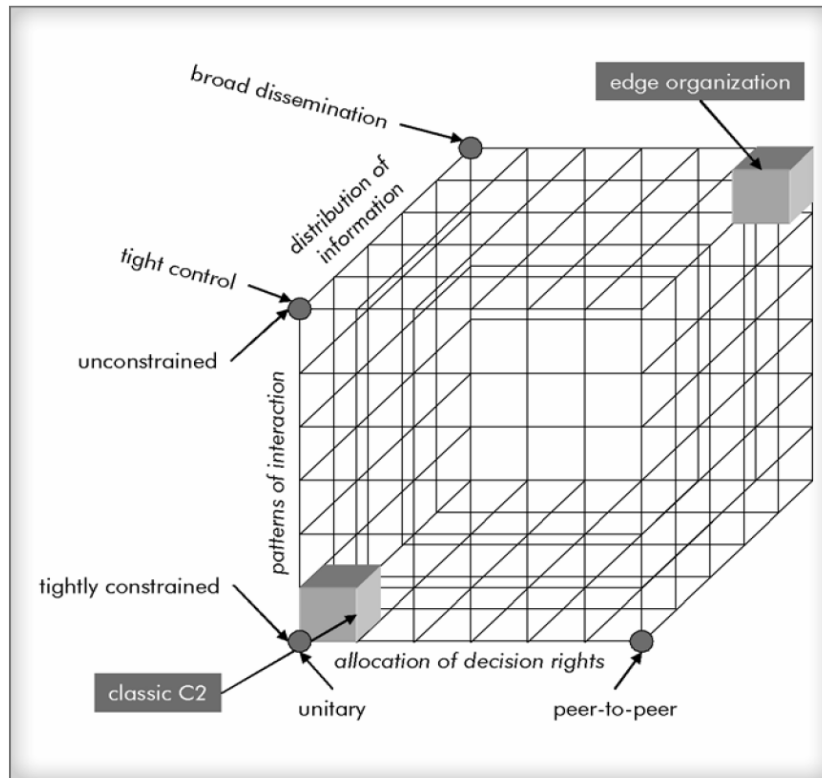
All of the C2 approach examples outlined in the earlier discussion of definitions in chapter 1 are only single points in a much larger C2 space. Although this space potentially comprises as many as 300 different variables, Alberts and Hayes assert that the space can be defined along three fundamental dimensions that define the essence of

command and control.¹ The C2 approach of a given military service, nation, coalition, or force may well be best understood as a region or collection of regions within the three-dimensional space rather than, as it is usually thought of, as a point within that space. According to Alberts and Hayes, the three dimensions of the C2 approach space are as follows:

- *Allocation of decision rights* (who can make what decisions) is their distribution within an enterprise or an organization. At one end of the spectrum is total centralization, where all the rights are held by a single actor. At the other end is total decentralization, where every entity has equal rights in every decision.
- *Patterns of interaction* (who can interact with whom and to what degree) comprise three elements: reach (the number and variety of participants); richness (the quality of the contents); quality of interactions enabled. In other words: who is “on the net,” what is the quality of their information, and how well can they collaborate?
- *Distribution of information* (who has what information and how is it shared) is impacted by the distribution of decision rights (which includes who makes the choices about information distribution processes and the creation of the infrastructure by which information is shared and collaboration is carried out, as well as who is entitled to what information) and the patterns of interaction (who is able to acquire what information).

Alberts and Hayes argue that nearly all common current C2 arrangements are essentially Industrial Age constructs and that there is a huge range of unexplored possibilities. As shown in figure 9, below, these range between current practice and a totally self-synchronized arrangement at the theoretical opposite corner of the cube depicting this C2 space.

¹ Alberts and Hayes, *Understanding C2*, p. 75.



Source: Alberts and Hayes, *Understanding C2*, figure 11, p. 75.

Figure 9. The C2 Approach Space

The command function in this space is to determine the degrees of freedom allowed for decision rights, patterns of interaction and distribution of information. This in essence determines how control will be exercised. Detailed discussion of these three key variables is found in a number of Alberts' publications, most recently (2006) in *Understanding Command and Control* (pp. 83–113).

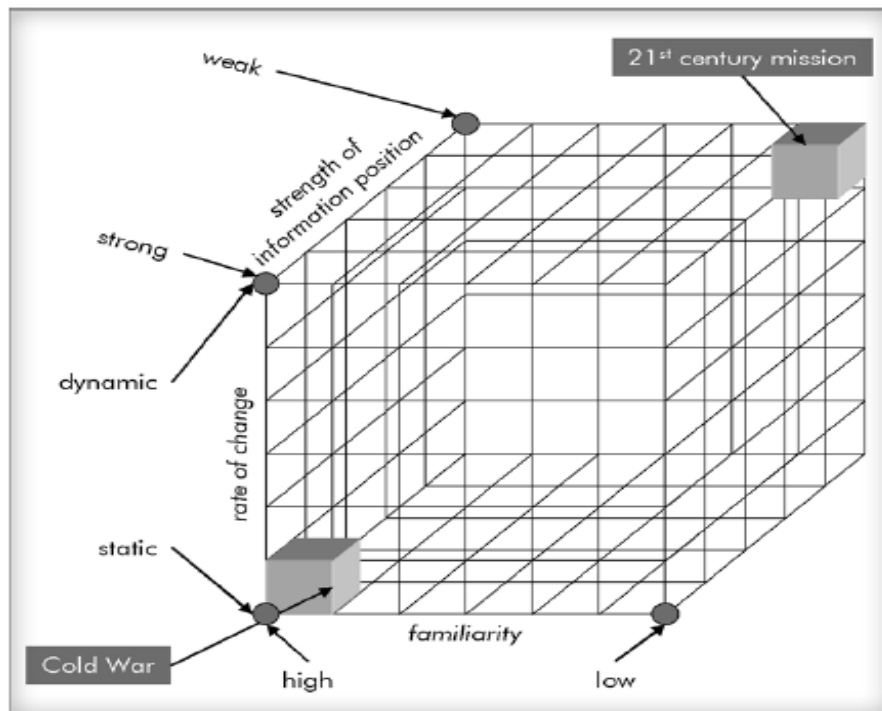
But C2 approaches make sense only in relation to a specific mission or mission set that defines a military problem against which resources must be applied and managed. Alberts and Hayes call this the C2 problem space and define it along the following three dimensions:

Familiarity. Is the nature of the problem known (e.g. Cold war) or must the C2 approach be prepared to deal with the unexpected? A more knowledgeable organization, one in which the situation is familiar to a large number of individuals, can distribute decision rights further than one in which less knowledge is present or knowledge is concentrated.

Rate of Change. Is the problem itself relatively static or is it dynamic and subject to evolution over time or along multiple paths? Static problems are those for which the situation itself does not change rapidly; Dynamic problems involve rapid change across all of these features—the location of critical times and places during the struggle change quickly, the operating environment is unstable, and the parties to the conflict innovate frequently and rapidly.

Strength of Information Position. What is the degree to which the organization is able to fulfill its information requirements? A well-informed force can distribute decision rights differently than a weakly informed one. Moreover, a well-informed force should distribute its information more broadly and encourage timely collaboration about what that information means and how to act on it successfully.

The problem is also best visualized as a cube, as shown in figure 10.



Source: Alberts and Hayes, *Understanding C2*, Figure 12, p 77.

Figure 10. The C2 Problem Space

Each dimension of the problem space potentially impacts each of the dimensions of the C2 Approach space. For example, greater familiarity with the enemy during the Cold War, a relatively predictable and slow rate of change of that enemy, and large amounts of information concerning the enemy bounded the C2 problem and permitted

use of a narrow set of C2 arrangements which were essentially gradually improved versions of the Industrial Age C2 model.

B. OTHER RECENT C2 CONCEPTUAL MODELS

The foregoing outline of recent thinking by the CCRP, helps illustrate the potential scope of CCJO C2 content that also should be found in both the functional concept and the joint integrating concept. We also looked at other theoretical sources.

Three conceptual models of future C2 recently have been developed somewhat sequentially. The Headquarters Effectiveness Assessment Tool (HEAT) was an attempt in the 1980s and early 1990s to better understand the C2 structures extant at that time. It helped better define components of C2 and furthered the process of understanding the complexity of C2. The Network Centric Operation Conceptual Framework (NCO CF) developed a decade later helped understand the implications of the information revolution on C2. Both models contributed to development of the SAS 050 Reference Model.²

The SAS 050 Reference Model offers 300 variables which in combination determine the location of the actual C2 approach on the CCRP three-dimensional C2 approach space (Alberts' Cube) described above. It offers two views—a process view and a value view.³ The process view is descriptive, while the value view includes metrics by which the quality of the variables can be measured. Both views are important, but the value view allows objective judgments of the C2 approach. It tells you what matters: Is the C2 approach under scrutiny appropriate to both the problem and the constraints on the approach space? Or in other words, Will it work well in this situation?"

Hence, the SAS 050 model may be the best baseline identified so far against which to measure the content of the CCJO and other JOpsC JC2 documents. As noted in the next chapter, some of them measure up reasonably well while it is difficult to apply any metrics to the CCJO itself.

² Ibid., p 164–172. Implicit in this statement is the recognition that many of the same people were involved in the development of all three models. The authors acknowledge there are other models of C2 in the literature, but determined that the CCRP and the SAS 050 models are rich in detail and are DoD /NATO products.

³ See Alberts and Hayes, *Understanding C2*, chapter 7 for the value view and chapter 8 for the process view.

C. CONCLUSIONS

In light of the above, it seems that the authors of CCJO and supporting C2 documents should be asking whether the CCJO JC2 is consistent with the CCRP work and the SAS 050 Reference Model. Indeed, because of the potential of the future information environment, getting C2 right for any given operation may be the single most significant force multiplier. What is needed is a highly flexible and malleable C2 apparatus. Perhaps the most important component of the flexible and malleable apparatus will be its human elements. Following are key issues arising from the CCRP and SAS 050 work that CCJO should take into account:

- The need for commanders to be aware of all the C2 alternatives available to them, to understand when each is appropriate and to know how to use them.
- The likelihood that the appropriate C2 approach will be different at different levels (e.g., operational versus tactical; high tactical versus low tactical) and for different mediums (land versus air versus sea).
- The need to recognize that the menu of C2 approaches available to commanders at varying levels and at varying times will be finite and determined by both the problem space and resources available to define the approach space. In other words, there will be limits on how adaptable C2 can be at any point in time.
- The major training and culture implications of moving away from the Industrial Age model that will cause great resistance to change and will hamper movement into the depths of the C2 approach space.
- The absolute need for the information architecture to be sufficiently flexible to support the widest possible range of alternative C2 approaches.
- The understanding that the agility of the force is directly related to the agility of the C2 system, which should allow the commander to tailor his C2 approach to the mission just as he would with other resources allocated for that purpose

Perhaps the best approach to evaluating the CCJO JC2 concepts would be to see how well they actually take these key future JC2 issues into account and, more generally, how closely they align with the CCRP/ and SAS 050 model.

The next chapter examines JOpsC JC2 concepts, which do indeed seem to be more aligned with the CCRP and SAS 050 model.

VII. JC2 IN JOINT OPERATIONS CONCEPTS

We reviewed the *Joint Command and Control Functional Concept* (JC2 FC) and the *Command and Control Joint Integrating Concept* (C2 JIC) to assess their consistency with the CCJO and to glean insight into future JC2 concepts or requirements that should be considered in future drafts of the CCJO. Additionally we reviewed the *Net-Centric Environment Joint Functional Concept*, the *Net-Centric Operational Environment Joint Integrating Concept* and the *Command and Control Joint Capabilities Document* for any additional insight and to confirm what we had concluded from our review of the primary (first two listed above) JC2 concept source documents. We found that all these documents are much clearer than the CCJO about JC2.

A. JC2 FUNCTIONAL CONCEPT

In the family of joint operations concepts the JC2 FC flows directly from the CCJO and is intended to apply “elements of the CCJO solution to describe how the joint force, 8 to 20 years into the future, will perform an enduring military function across the full range of military operations.”¹ It is supposed to identify “the operational-level capabilities required to support range of military operations operations and the key attributes necessary to compare capability or solution alternatives ... [It should] “provide functional context for JOC and JIC development.”²

The *Joint C2 Functional Concept* is consistent with the C2 JIC, which is covered below, and the CCRP work discussed in chapter 6. In fact, it appears to have drawn heavily from the latter.

As the following threads indicate, the JC2 FC leaves no doubt about its vision of how JC2 will be executed in 2015 in support of the JFC. It provides an approach for transforming C2 capabilities primarily at the operational level and argues that an Information Age C2 paradigm is needed.³ And when that happens “commanders can

¹ http://www.dtic.mil/futurejointwarfare/concepts/jroc_c2_jfc.doc.

² CJCSI 3010.02B, Joint Operational Concepts Development Process, 27 January 2006, pp. A-2 and A-3.

³ JC2 FC, p. vi.

then tailor their C2 assets to best insure mission success and still maintain unity of effort and unity of command.”⁴

The JC2 FC Concept Statement is comprehensive and unambiguous:

Enabled by a robust, secure, integrated network, and through the employment of collaborative information environments, the Joint Force Commander will possess a seamless, deployable command and control capability. Supported by skilled personnel trained in joint operations and standardized joint SOPs, the Joint Force Commander will be able to create desired effects at the right time and place to accomplish the mission.

In 2015, Joint C2 will be agile across the range of military operations. Joint forces, interagency, multinational partners, and non-governmental organizations will be able to rapidly respond and decisively execute commander’s intent in a complex, uncertain and dynamic operating environment. C2 processes will be performed collaboratively to improve the speed and quality of the individual decisions and allow for the rapid and continuous synchronization of multiple decisions to achieve unity of effort. Commanders will rapidly tailor their C2 capabilities to any situation and will be able to exploit the benefits of decentralization—initiative, adaptability and tempo— and achieve flexible synchronization without sacrificing unity of command. This will be achieved through a collaborative information environment that enables cohesive teams, regardless of location, to develop a shared understanding of commander’s intent and the battlespace, thereby enabling superior decision-making.⁵

Finally, the concluding section of the JC2 FC leaves no doubt that the concept for JC2 is not JC2 as we know it today:

The increasing complexity, uncertainty, and dynamism of the operational environment have significant implications for the conduct of warfare and crisis resolution in the 21st century. As the environment is becoming more challenging, the need for being more precise and discriminating in the application of force is further raising the bar for the effective performance of command and control. The implication for Joint C2 is that the old ways of doing business, rooted in the Industrial Age, are no longer sufficient and need to be replaced by an Information Age C2 paradigm. Command and control need to become more agile while maintaining enough quality and speed of decision to get inside an adversary’s decision cycle. It needs to give commanders the option to employ a wide range of command methodologies and control mechanisms so that they can readily address the new situations in which they find themselves. It needs to tie together the numerous decision-making processes taking place across the range of participants in the diverse coalitions of the future.

⁴ Ibid., p. vii.

⁵ Ibid., p.1.

The conduct of future Joint C2 will be significantly different than it is today. There are some substantial benefits that will be realized as this future Joint C2 concept is implemented. The future C2 process will allow for:

- o A noticeable improvement in speed and quality of decisions throughout military organizations;
- o C2 decision cycle time will be faster than any adversary's;
- o Opportunities to make proactive decisions that allow U.S. forces to shape the battlespace;
- o Decentralization that will in turn allow the C2 process to be more agile and able to deal with change, complexity, and uncertainty; and
- o The empowerment of individuals without sacrificing unity of effort.
- o The future Joint C2 will be enabled by collaboration and a collaborative information environment. This will allow:
 - o People in large, distributed organizations to interact like small cohesive teams;
 - o Directness, informality, and flexibility;
 - o Commanders and staffs to tailor C2 as required for mission accomplishment; and
 - o Cohesive teams to be quickly assembled.

Achieving this transformation requires a set of new capabilities that capture key cognitive, organizational and technical elements in an integrated fashion. The attributes of Joint C2 in the Information Age need to capture the interactions among these differing capabilities. The capabilities will be brought to bear through the development of a number of enablers. While technical solutions will play a large part in the transformation of Joint C2, the leadership and creativity of the human decision-maker will remain central.⁶

B. C2 JOINT INTEGRATING CONCEPT

In the family of joint operational concepts the *Command and Control Joint Integrating Concept*⁷ flows directly from the JC2 FC. A joint integrating concept is defined as follows:

⁶ Ibid., p. 34.

⁷ http://www.dtic.mil/futurejointwarfare/concepts/c2_jic.pdf.

An operational-level description of how a joint force commander, 8 to 20 years into the future, will perform a specific operation or function derived from a JOC and/or a JFC. JICs are narrowly scoped to identify, describe, and apply specific military capabilities, decomposing them into fundamental tasks, conditions, and standards. Further analysis and expansion of tasks, conditions, and standards is accomplished after JIC completion in order to effectively execute CBA [capabilities-based assessment]. Additionally, a JIC contains illustrative vignettes to facilitate understanding of the concept.⁸

The C2 JIC meets this JIC definition. It expands upon the JC2 concept elaborated in the JC2 FC. Unlike the JC2 FC, which is mute about the CCJO,⁹ the JIC references the CCJO several times and claims to be implementing CCJO ideas.¹⁰ It offers very progressive concepts regarding JC2 and explains in greater detail the potential nature of JC2 in 10 to 15 years. The JIC is completely consistent with the CCRP work. Moreover, it includes all the right hooks to open minds to alternative C2 approaches that are purportedly better. The C2 JIC is clearly arguing for a decentralized approach with flatter C2 structures while preserving commander's intent and cohesive action. And it specifically says that commanders "can tailor their C2 assets to best insure mission success and still maintain unity of command and unity of effort."¹¹

The following excerpts from the C2 JIC (p. 9) articulate three key assumptions:

1. A secure, trusted, global networking infrastructure (evolution of the Global Information Grid [GIG] infrastructure) will be in place.
2. Core enterprise services (CES), including data/information discovery, access and storage, security, messaging and collaboration capabilities, will be provided.
3. BA [battlespace awareness] information from terrestrial and space-based sources, including "fused" intelligence and geospatial information and information on friendly forces, other actors, the environment and relevant political and diplomatic developments, will be available at all levels of war, from strategic to lowest tactical level, to enable coherent decision making.

⁸ CCJSI 3010.02B, p. A-3.

⁹ Probably because the CCJO, while existing in draft, had not yet been published. Of further note, according to Mr Jack Hoesly, JFCOM/J82, the JC2 JFC was written at a time (March 2004 time frame) when "command and control" and "network systems work" were essentially synonyms; that is why J6 was the primary author.

¹⁰ For example see C2 JIC pp. 15 and 18.

¹¹ CCJSI, p. 15.

All three capabilities must be present and reliable enough to give commanders, staffs, and operators confidence in the postulated new C2 paradigm. In its description of the future military operating environment the C2 JIC summarizes the implications of the future operating environment for C2:

Joint C2 must become more agile in order to continue operating with sufficient speed and quality of decision to operate within an adversary's decision-making cycle.

Increasing the agility of Joint C2 will enable commanders to better deal with the uncertainty, complexity, and dynamism of the operating environment. Commanders need access to the information held by their colleagues in other echelons or to inform those in command of other functions. They need to collaborate on their decisions to maintain unity of effort in a rapidly changing environment. They need to be able to employ a variety of coordination and synchronization mechanisms in order to rapidly maximize the effectiveness of forces at their command. Joint C2 must enable commanders to decentralize command and control, encourage initiative in lower echelons, and quickly respond to changes in the operational environment.

The future operating environment presents great opportunities to enhance C2 capabilities. Deployment of increasingly powerful and robust information networks will enable information sharing and collaboration capabilities that, if adequately protected, can transform C2. The availability of multi-source, multi-path information will lead to greater shared awareness and understanding as well as a higher degree of confidence and lower uncertainty in the availability and quality of information. Service cultures will evolve to accept and take advantage of a collaborative environment. An increasingly well-educated, resourceful officer and non-commissioned officer corps that can fully exploit information technology (IT) tools and resources will provide the foundation for a more collaborative, decentralized and agile approach to C2. (p. 12)

At the heart of the C2 JIC are the central and supporting ideas. They “describe how the military problem will be solved in order to provide effective C2 for future commanders. These ideas distill and implement the vision of future C2 presented in the Joint C2 Functional Concept.”¹² Both are summarized as follows:

Joint C2 needs to be agile in 2015. This goal can be achieved by connecting the individual commanders across the echelons and functions of a military organization through a networked infrastructure. ... Connecting the individual commanders improves the speed and quality of their decision processes and the speed and quality of decisions throughout the military organization as a whole. The improvement in speed and quality is the result of the individual commander's ability to collaborate during the decision-making process.

¹² C2 JIC, p. 15.

Collaboration improves the decision-making process by reducing uncertainty and increasing understanding of the operational environment because commanders are able to fill gaps in their operational picture through access to a common pool of information. Commanders can then tailor their C2 assets to best ensure mission success and still maintain unity of command and unity of effort. The result is commanders and staffs will have an enhanced ability to make faster and more effective and an improved ability to see to their execution. Joint C2 in 2015 will also:

- o Allow people in large organizations to interact with the directness, informality and flexibility typical of small, cohesive teams or organizations;
- o Allow commanders and staffs to tailor the C2 system as required by quickly assembling cohesive teams and by adopting C2 procedures suited to each situation rather than relying on 'one size fits all' procedures; and
- o Allow the force to exploit the benefits of decentralization—initiative, adaptability and tempo—without sacrificing coordination and unity of effort.

The functional concept envisions a dynamic, decentralized, distributed, and highly adaptive form of Joint C2. (pp. 15-16)

The C2 JIC then elaborates in detail on the central and supporting ideas. This discussion includes the following concept rationale:

Subordinate commanders will be able to execute the plan faster and with better synchronization because they have been closely involved in the planning, share the senior commander's understanding of the situation and have the authority to act on their own initiative. Robust network communications and collaboration capabilities will let them consult rapidly with each other and the senior commander when problems arise. Self-synchronization of subordinate force operations, enabled by robust communications and shared SA, will expedite operations and improve synchronization. Shared situational understanding will promote unity of effort with mission partners by enhancing mutual understanding. (p. 17)

In discussing four supporting ideas the C2 JIC elaborates on key elements of this concept rationale. Each idea is loaded with implications. The key supporting ideas are as follows: 1) parallel, distributed, collaborative planning, and execution management; 2) effects-based approach to operational planning; 3) self-synchronization of subordinate forces; and 4) a flexible approach to joint force and staff organization. The fourth of these

supporting ideas specifically mentions the possibility of organizing the joint force in new and different ways.¹³ (p.18)

Finally, the C2 JIC lists and explains the capabilities and associated tasks necessary to realize the vision of the JC2 FC and the C2 JIC and by extension the CCJO. One of these is particularly interesting because it reflects the influence of the CCRP models. Capability 2 is “establish/adapt command structures and enable both global and regional collaboration.” The C2 JIC states:

Commanders must be able to quickly establish or adapt command structures across the force and within the staff tailored to the mission, and to create the processes that will enable horizontal and vertical collaboration. They must have a menu of alternative schemes for organizing the components and defining command relations, with associated guidance on when and how to apply them. It is essential that the infrastructure be in place to enable rapid reaction to new crises. (p. 23)

In other words, commanders must be able to choose the best approach to both command and to control. To do so the commander must know he has a choice and how best to make it. Similarly the mechanisms must be in place to implement that choice. This statement and those preceding it carry enormous DOTMLPF implications.

In conclusion, the C2 JIC lives up to its billing. It lays out in detail a concept for an Information Age C2 paradigm that is consistent with and supportive of the JC2 FC concept for C2. Additionally it supports the unstated implications for C2 in the CCJO.

C. OTHER CONCEPTS

In addition to reviewing the JC2 FC and the C2 JIC we reviewed the Net-Centric Environment Joint Functional Concept (NCE JFC),¹⁴ the Net-Centric Operational Environment (NCOE) JIC,¹⁵ and the draft Command and Control (C2) Joint Capabilities Document (C2 JCD)¹⁶ to cull additional insight and to confirm what we had concluded from our review of the primary JC2 concept documents. The NCE JFC details how the network must work to support both collaboration and distributed decision-making.

¹³ It specifically mentions “organization of the Joint force by warfighting functions, such as strike, maneuver, protection, logistics, and information support. The option to organize the commanders’ headquarters along similar lines should also be maintained.”

¹⁴ Version 1.0, 7 April 2005. http://www.dtic.mil/futurejointwarfare/concepts/netcentric_jfc.pdf.

¹⁵ Version 1.0, 31 October 2005. http://www.dtic.mil/futurejointwarfare/concepts/ncoe_jic.pdf.

¹⁶ Draft dated 10 November 2006.

Interestingly it uses language nearly identical to that of the CCRP in labeling “information and decision rights and responsibilities.”¹⁷ Without delving into details of the document suffice it to say it is consistent with and supportive of the JC2 FC and the C2 JIC.

The NCOE JIC builds upon the NCE JFC, extending its integrating framework and articulating how net-centric tasks will be used to advantage by the future Joint Force.¹⁸

The NCOE JIC is all about knowledge (i.e., information), particularly its dissemination (one axis of the Alberts C2 cube). It is explicitly and directly supportive of and congruent with the CCJO’s fundamental action, “knowledge.” For example, it states:

Every functional area of the Joint Force ...will be integrated, via the NCOE The NCOE will also integrate the network capabilities of mission partners, including non-governmental organizations and private businesses. These integrated capabilities will facilitate the fluid, coherent application of joint military action through *pervasive knowledge*. [emphasis added].¹⁹

The concepts and enabling structures and systems presented in the JIC will allow movement out along the Alberts cube axis “distribution of information.” However, this will happen only if the C2 “climate” (organizationally, bureaucratically, understanding, etc.) allows it to happen (i.e., Does the commander know enough about his C2 options to move in the cube, and is his upward chain of command both knowledgeable enough and flexible/trusting enough to allow him to do so?) This is a fundamental issue. Proper coverage of C2 in the CCJO is critical to achieving such a climate.

The C2 JCD is also supportive of the JC2 FC and the C2 JIC. It is essentially an expansion of the capabilities and tasks identified in the C2 JIC and an effort to identify gaps in existing capabilities (it appears to do the latter quite thoroughly).

The inescapable conclusion about these concept documents is that they are ahead of the CCJO in clearly articulating the centrality of JC2 to realizing all other elements of the capstone concept. Specifically:

- All are all consistent with the CCRP/SAS 050 theoretical constructs.

¹⁷ NCE JFC, p. 15. Two dimensions of the Alberts’ cube are labeled “allocation of decision rights” and “distribution of information.”

¹⁸ NCOE JIC, p. 2.

¹⁹ Ibid, p. 7.

- All describe future C2 as being very different from today's doctrinal approach.
- All state or imply that the old ways of doing business are no longer sufficient and need to be replaced by an Information Age C2 paradigm.
- All envision that JC2 will employ dynamic approaches, including flexible organizational structures, decentralized decision-making authorities, and widely distributed information to capitalize on the power of widespread collaboration.
- All see the joint force commander tailoring C2 assets to best ensure mission success while still maintaining unity of effort and unity of command.
- Massive simultaneous parallel collaborations across all domains enabled by the GIG, CES, and BA information from trusted fused sources is the key "big idea" threaded throughout the concepts.
- All support the assertion that in the future:
 - In the context of Joint C2, collaboration will be used to coordinate the development of decisions and actions across multiple basic C2 processes" and
 - These collaborative C2 functions will give Joint C2 in 2015 its agility and the ability to support any command and control method that may be implemented.
- All include implicit reliance on decentralized self-direction and self-synchronization.

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VIII. DARPA AND JFCOM JC2 WORK

To round out our survey of sources to gain JC2 insight relevant to the CCJO we looked at selected DARPA and JFCOM work.

A. DARPA WORK

For insight into DARPA's work in the C2 area we reviewed a recent DARPA book on C2 and interviewed its editor, Dr. Alex Kott, a program manager who is currently developing advanced C2 tools. The book and interview strongly validate the Alberts theoretical construct for future C2. Both sources illuminate, for both command and control, DARPA work on enabling technologies that demonstrate it will be possible to move out onto all three dimensions of the Alberts cube *if* commanders know when and how to do so and support systems have been designed accordingly.

The recent book *Advanced Technology Concepts for Command and Control* which reports on "a program sponsored by the Defense Advanced Research Projects Agency ... to explore innovative technologies with the potential to catalyze a revolutionary change in command and control."¹ Although focused on C2 of Air Forces, all the technologies developed at DARPA and described in the book have broader applications and potential implications for JC2. The technologies enhance both the command and the control of the force.

On the command dimension the following decision/planning support technologies enable new approaches to organizations and procedures and applications of technical means:

- Artificial intelligence (AI) to assist the commander in formulating "intent"
- AI to predict enemy courses of action
- AI to assist the commander in selecting friendly courses of action
- AI to assist commanders in judging when to change or adjust a course of action

¹ Alexander Kott, editor, *Advanced Technology Concepts for Command and Control* (hereinafter *ATC for C2*), Xlibris Corporation, www.Xlibris.com, 2004, p. 17.

- AI to assist the commander in decentralizing decision-making
- AI to assist both commander and staff in decentralized planning (rapidly and efficiently produce a suboptimal but robust and workable plan)
- AI to decentralize execution decision-making
- Aids to help commanders cope with asymmetric opponents

On the control dimension *ATC for C2* describes numerous aids derived from formal control science and related methods that enhance “the commander’s assurance that the forces under his ... supervision are properly synchronized in space, time and purpose to achieve the desired intent.” (p. 17)

Together these advances in both command and control increase the agility and stability of C2, thereby enabling the commander to have much more flexibility in his approach to C2. The following excerpts from *ATC for C2* illuminate this point:

“The technology concepts ... imply a radical invasion in what was heretofore the exclusive domain of human decision-making – military command, a most hallowed ground of human intellectual endeavor in which life and death of men and nations was decided.” (p. 403) “The technologies described ... address aspects of military decisions that just 11 years ago were considered unsuited for ... automation; that is, these tools offer support for the higher-order cognitive processes typically associated with tactical planning and execution” (p. 404)

The authors argue that, in the future, decision aids will be able to dramatically improve decision making by removing from humans the need to process large amounts of information. The aids will sort it out and make sense of it, while the humans will manage the automation and have more time to think.

ATC for C2 “conveys a vision of a cooperative decision-making situation, where information and decision-making authority are distributed among humans and automation.” (p. 405) But “distancing humans from work requires that humans have different types of knowledge about their tasks so that they can effectively supervise operations.” (p. 408) Just as a pilot must understand how his autopilot works and when to override it, future commanders and staffs will need to know how to take advantage of the suite of decision and control aids at their disposal and when to exercise direct human intervention.

The book hypothesizes that “control theory and its supporting technologies have developed sufficiently to be applicable to problems in C2.” (p. 421) The authors believe

that the DARPA research demonstrates that the hypothesis has been tested and that “control theory will have a significant, perhaps revolutionary, impact on both the organization and concepts of operation of future C2 systems.” (p. 421) The difference between “significant” and “revolutionary” may be how soon and well concept publications like the CCJO come to grips with the potential revolutionary aspects of these technologies.

In the summary chapter (pp. 421–440) the authors recap the central ideas. They are that future C2 systems are likely to:

- Be much more flexible and adaptive than those of today and with less specialization.
- Aid reasoning, enabling “commanders to operate routinely with levels of complexity otherwise unimaginable.”
- Assist commanders in discerning enemy intent and then validating or adjusting the initial hypothesis through observing enemy actions.
- Offer the capability to model friendly and enemy behavior and predict outcomes.
- Offer technical approaches for dealing with uncertainty and the fog of war.
- Incorporate “the deployment of autonomous or semi-autonomous entities cooperating with each other and with humans to accomplish military objectives.”
- Trend toward a biological model of C2 in which the “centralized commander has become significantly less important” and the system “agents (or, sensors and weapon systems) interact directly with the local environment, as captured by the far-flung network of local place agents.”

Perhaps the most explicit statement in the book which seems to underscore the validity of the theory underpinning the Alberts’ cube and describing Alberts’ “edge organization” is the following:

The most radically decentralized concept of operations of all those discussed above [preceding chapters], the organisms model has the greatest potential for revolutionizing traditional C2 organizations and practices. In many ways, it best fits a largely autonomous force structure, with relatively large numbers of simple, inexpensive platforms. Is such a brave new world what lies ahead? Only time will tell, but the investigations presented here show convincingly that the technological underpinnings for such a system are indeed achievable. (pp. 436–437)

B. INTERVIEW WITH ALEX KOTT

In an e-mail exchange and telephone interview, Dr. Alex Kott expressed the following views.²

There are likely C2 trends that we will see in the next 10–15 years that apply regardless of the “jointness” of the activity. Three are particularly noteworthy. First, more information will flow to direct-action units (at the “edge,” where OPTEMPO is highest and time to think the least), and these units will have more responsibility and decision authority. Second, more decision aids will be at the edge (to help manage the increased information there). And third, humans will focus more on higher-level decisions and exception handling, while automation will manage information and routine activities. In effect, we will learn to fly on “C2 autopilot.”

In addition: 1) Organizations will be flatter with greater span of control; 2) There will be more network and less hierarchy; 3) There will be more dynamic allocation of roles, tasks, and relations (this is happening anyway, e.g., the Marines are thinking about this and they are pushing distributed operations and following German *Auftragstaktik* but with better communications). 4) There will be more model-predictive (wargaming) C2.

Dr. Kott also outlined some likely trends in C2 that apply specifically to “jointness.”³ The principal ones are as follows: 1) Increased “jointness” will be through distribution, not through more joint organizations. 2) There will be a society of joint organizations and systems, not a monolithic organization or system; consequently, joint organizations once standardized will become more flexible. (In fact there will be frequent dynamic reorganization.) 3) The lowest echelons will be empowered and they will act jointly the fastest. 4) “Jointness” will move to the edge, making the lowest-level organizations joint and empowering them.

Still other trends were cited: 1) There will be a “market-based,” “mercenary” contracting model with a way to pay (reward) an organization for supporting another

² E-mail 26 October 2006. Interview 27 October 2006.

³ Dr Kott’s notes: *Note 1* - joint means *distinct* organizations doing some tasks together: that requires doing actions that fit together (e .g. 1a: institute unified central command; or 1b: ditto at direct action level by creating task force, but inefficient for general purposes. note. *Note 2* - common current ways to do coordinated actions by multiple organizations with distinct cultures (e.g., 2a: peer negotiation at high level; or 2b: the trend toward coordination at the direct action level).

organization, i.e., a system to incentivize (like pay) distributed operations.⁴ 2) Metrics must be developed to determine the appropriate pay (reward).⁵ Negotiation and coordination will be semi-automated, and we are already seeing the emergence of common computerized C2 language (schema) that enable this.

All of these “jointness” trends are variations of trends in business, where upper-level management sets goals and lets lower levels (edge) execute. Those at that level were formerly constrained by lack of information, but now they have it and can act quicker and make better decisions so management lets them do it at least in nimble Information Age businesses.

Derivative from the above are major associated training issues. For example, if more and more rapid decisions require automatic decision aids (including some like autopilots) how do we train troops to trust them?

Dr. Kott totally agrees with the CCRP work. He believes Alberts—assisted by Hayes, especially with the writing—is the preeminent thinker in the C2 field. Alberts’ “edge” concept implementation for years was constrained by lack of information at the edge. Now edge organizations have more information and therefore the concept is feasible. Adjusting C2 along the three dimensions of Alberts’ cube (like a rheostat) is the wave of the future and can be done. Finally, Dr. Kott believes much more experimentation with the Alberts’ concept (the cube) is needed and DARPA could make significant contributions to this work.

C. CURRENT JFCOM WORK ON FUTURE JC2

We examined JFCOM work in the C2 area through a sampling of four sources. One was an interview (followed up with information papers) with BG (ret) Pat O’Neal, who has been a senior mentor for the Command Post of the Future (CPOF) since its inception as a DARPA project.⁶ Recently, CPOF was used in the JFCOM URBAN RESOLVE 2015 Experiment and as a result BG O’Neal is very familiar with projections

⁴ Units/cells at all levels should have an incentive to help those who need it or who offer the biggest potential payoff so that self-synchronization is fostered. With incentives and distributed information, the lowest units will usually be in the best knowledge position to act in the best interest of the whole while at the same time keeping superiors (and others) informed.

⁵ Who did you help today and how much? Nokia is run this way. Employees bid on the projects they will work on. Managers can pick teams based on talent pool.

⁶ Interview on 2 November 2006.

of future C2 in the 2015 time frame and beyond as instantiated in the experiment. O’Neal believes Alberts’ C2 theory and model is correct. He thinks a C2 tool like CPOF is part of the solution to move our Industrial Age C2 systems toward the Information Age. CPOF (and as a result of UR 2015 JCPOF) offers two key advantages over old systems—pervasive collaboration and the opportunity for knowledge management which includes creating new knowledge.⁷ Both are essential elements of future JC2 as envisioned in the CCRP work and laid out in the JFC and JIC.

BG O’Neal also is very familiar with current JFCOM C2 experimentation and does not consider it very forward thinking. He describes it as more in the mode of improving current JC2 systems and approaches to make them better, particularly by taking advantage of the network. This is largely due to a general lack of understanding of the JC2 vision in the JIC and related concept papers. He did not comment on JFCOM concept development itself.

The second source was the JFCOM staff. The study team traveled to JFCOM to interview several future concepts and capabilities developers in J-8 and J-9 working JC2.⁸ Key among them were John Wellman, GS-15, Chief, Joint C2 Capabilities Development Division (J88), and Lt Col Nicole Blatt, Chief, Command and Control Transformation Branch, J-9 (which authored the JIC). The staff presented briefings on JC2 concepts and capabilities development and discussed the IDA team’s preliminary findings and conclusions regarding JC2 and the CCJO.⁹

Every member of the staff we met with was quite aware of the CCJO and the role it does/should play in their “business.” Although most of J8’s focus is relatively near term and is oriented on the acquisition of technology-based capabilities and systems, the discussions still provided a good deal of insight into the state of current thinking about C2 issues at JFCOM. The briefings and ensuing discussions helped to fill gaps in our knowledge of concept development and capabilities by JFCOM and raised several issues and ideas that might be incorporated into the CCJO.

⁷ O’Neal provided short papers on collaboration and knowledge management.

⁸ 15 Nov 2006. Also at the meeting were Tom Lang (J82), Lisa Hollowell (J82), and Jack Hoesly (J82).

⁹ JFCOM briefings were on C2 Capability Portfolio Management (C2CPM); joint command and control; Joint Battle Management Command and Control (JBMC2); Net-Enabled Command Capability and Joint Combat Capability Developer (NECC/JCCD); Command and Control Joint Capabilities Document (C2JCD); and the Command and Control Joint Integrating Concept (C2 JIC) “Spreading the Word.”

Because most of J8's work is systems oriented, there is limited direct work on future concepts except for determining how they may impact technical systems, and what systems can best bring future concepts to fruition.¹⁰ All agree that the "traditional" C2 organization is passé. However, the entire group is in agreement that the "guidance" regarding command and control in the CCJO is very vague and of little use. Consequently, they have been forced to spend a good deal of time and effort trying to "divine" what it is they are supposed to be doing and following. They recognize that current C2 doctrine does not say much about the future (because that is not its job) but they also are of the opinion it doesn't say much that is useful about current JC2 either.

Additionally, the group sees a fundamental disconnect between "concept" and "implementation." From their perspective, Title X issues will remain an impediment to realization of the CCJO and its concepts for the foreseeable future unless underlying Service issues are adequately and appropriately addressed.¹¹ Additionally, the group expressed concern about appreciation of the new concepts outside the C2 research and concept community and cultural impediments that might cause the implementation to fall far short of its potential. They also believe an intensive "spread-the-word" campaign is needed to update/educate the force, especially senior leaders, about the vision for future JC2 and that greater clarity in the CCJO could help. Finally, all agreed that well-designed experimentation is needed to validate the concepts and educate future users/commanders.

Equally valuable was the feedback from this "expert" group on the IDA findings and ideas for possibly improving the CCJO coverage of JC2. The feedback was all positive with respect to both the general azimuth and specifics. The group agreed that a vital piece is missing from the CCJO—an extensive and clear discussion on command and control of the future force.

The third source of information was a meeting (on 9 January 2007) with RADM James "Sandy" Winnefield, JFCOM, J-9, supplemented by a copy of a recent detailed briefing on J-9 activities and priorities that expanded on many of the points made during the meeting.¹² Both sources make it clear that much is happening in J-9 with respect to

¹⁰ For example, according to Ms Hollowell, the overall concept of the JBMC2 program is to provide at least some portion of the C2 technical systems to achieve the fundamental actions of knowledge and reach, and that contribute to several of the characteristics of the future force outlined in the CCJO.

¹¹ Title X refers to Service control of most C2 acquisition.

¹² JFCOM, J-9 Briefing, "Joint Innovation and Experimentation (JI&E) Directorate" dated 10 January 2007.

JC2 concept development and experimentation. In fact, the forward-thinking JC2 JIC was authored in J-9. The three top JFCOM priorities being actively worked in J-9 are all JC2 topics, as follows: “Enable Achievement of Unified Action; Integrate Operations with Intelligence; and Enhance joint command and control.” (JFCOM briefing slide 3)

It is not clear, however, that there is a direct connection between the CCJO, the subordinate concepts and the JC2 activities in J-9. J-9 experimentation includes only some aspects of JC2, albeit important ones. It does not appear to be a comprehensive examination of the JC2 concepts nor is it based upon an overall framework designed to explore future JC2 as described in the future joint concepts; rather, it is primarily systems-focused (as discussed in Chapter 4). This raises questions about the clarity of the CCJO vision with respect to JC2 and confirms the assessment of J-9 experimentation offered by BG O’Neal as described above.

The fourth source of information was precisely one such experiment. As was mentioned in chapter 4, CJCSI 3010.02B requires the concept authors of the documents included in the JOpsC family to coordinate experimentation with USJFCOM. Specifically, it highlights the fact that “experimentation may also be used to *help refine the concept even while it is being developed.*”¹³ [emphasis added.] JFCOM J9 followed this guidance during the development of the JC2 JIC. The stated purpose of the experiment, held four months prior to the actual publication of the JIC, was to examine the capabilities, tasks, and standards of the JIC to serve as a mechanism for refining the document and to prepare the concept for the C2 Capabilities-Based Assessment (CBA).¹⁴

The experiment appears to have been very useful in helping to inform some of the concepts, and refine the tasks, conditions, and standards outlined in the JIC itself. But there is one disconnect between the experiment and the JIC. By design, the experiment focused only on major combat operations, although the JIC itself is “advertised” as addressing all C2 functions at the operational to the tactical level, and the key ideas and capabilities outlined in it apply across the range of military operations.

While the details of the observations from the experiment are not appropriate to include here, two general statements can be made. First, the experiment results imply that

¹³ CJCSI 3010.02B Joint Operations Concepts Development Process (JOpsC-DP), 27 January 2006. Enclosure D, p. D-1.

¹⁴ JFCOM/J9, Final Report for C2 JIC Wargame, 26–28 April 2005, 12 May 2005. Report is classified FOUO.

current doctrine (as was pointed out in chapter 2) is not necessarily fully compatible with the CCJO. Second, the observations reinforce the notion (mentioned throughout this paper and detailed in chapter 9) that the CCJO will require future C2 approaches—and structures—to be adaptable rather than “one size fits all.”

D. CONCLUSIONS

All told, the sampling of DARPA and JFCOM work strongly agrees with and supports both the CCRP theoretical model and the future JC2 concepts found in the JC2 FC, the C2 JIC, and the other related concept documents. DARPA has been working on a range of C2 support software packages that help make the CCRP, JC2 FC/C2 JIC approach feasible. JFCOM work on the concepts side also is consistent with the CCRP work and JOpsC documents (except possibly the CCJO). But knowledge of the concepts and their postulated decentralized collaborative approach to C2 or their DOTMLPF implications is not widespread, and there are major cultural impediments to realizing the vision. Better appreciation of the way ahead for JC2 is needed, especially among senior leaders. Finally, well-designed experimentation is needed to validate the concepts and educate future users/commanders.

BG (ret) O’Neal, CPOF guru and C2 senior mentor for UR 2015, agrees with CCRP theoretical work and argues that “CPOF-like” collaborative and knowledge management capabilities will help make it feasible. But he believes that aspects of JFCOM experiments related to JC2 thus far tend to be focused on marginal improvements to the status quo JC2 approach and not on the visionary concepts. Thus, though useful work is being conducted in J-9, it needs to be guided by and structured around the JC2 concepts that are derived from the CCJO.

In sum, much greater clarity about the JC2 vision is needed, and that clarity should start with the CCJO.

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IX. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Based on the analysis of the CCJO and insight and discovery from the review of documents that might illuminate future JC2 we reached conclusions on the four basic questions posed for the study after the sponsor approved broadening its scope. The questions with our responses follow.

1) Are doctrinal joint command structures adequate to execute the CCJO; why or why not?

Our short answer to the question is “no.” The doctrine is inadequate, but that should be no surprise since it is by definition a description of how current forces should operate, not how future forces might operate. Moreover, the issue is much broader than joint command structures alone since, as the CCRP work clarifies, they are only one of many components of JC2.

Nearly all doctrinal documents and other current instantiations of JC2 tend to describe or support the *status quo* approach to JC2 but perhaps with technical enhancements (e.g., network enabled *status quo* operations) to make it work better. If projected into the CCJO future this would at best result only in a much improved version of the Industrial Age approach to C2. While this would work it would not fulfill the CCJO intent, which is to stimulate a transformational change from today’s *modus operandi*. The fundamental concepts in the CCJO, especially knowledge, will depend on the adoption of significantly different JC2 approaches (including but by no means limited to command structures) to realize their full potential.

2) What C2 options exist or what new C2 capabilities are required to close any gaps and to achieve the C2 requirements implied in the CCJO?

We conclude that significant JC2 gaps exist but the CCJO alone does little to illuminate those gaps or required capabilities. The JC2 FC, the C2 JIC, and the NCE JFC, on the other hand, do describe the future JC2 concepts, and the C2 JCD outlines numerous gaps. In effect, the desired new C2 options (concepts), the required new

capabilities, and the resulting gaps are documented, but one cannot make a strong case linking them specifically to the CCJO.

3) Does the CCJO clearly and adequately describe (or imply) the JC2 dimension of how joint forces are expected to operate across the range of military operations in the 2013–2026 time frame?

We have determined that the CCJO does not clearly and adequately address future JC2. This is primarily because the CCJO never mentions JC2 directly in the body of the paper although the clear need for advanced C2 concepts is implied throughout it. In fact, we infer that the CCJO is more about JC2 than anything else without acknowledging it.

Why is this omission so important? It is because JC2 is *the* critical transformational development in how future forces will operate. The argument is threefold. First, the UNAAF says, “C2 is the most important function undertaken by a JFC.” One could even argue that it is really the only joint function. If that is true should not the CCJO build on that fact? Second the fundamental joint action “knowledge” is both dependent on and a component of JC2. Knowledge does not just happen. Knowledge is created, shared, and exploited through collaboration and is a function (and output) of the JC2 approach. The existence of a network alone will not optimize knowledge and the joint force’s use of it. The JFC through his JC2 approach must determine how to optimize knowledge creation and dissemination in order to optimize the effectiveness of all other joint actions. Finally, JC2 is too important to be left entirely to the JC2 FC, C2 JIC, and other subordinate concepts. Punting on JC2 in the CCJO simply leaves too much room for misunderstanding, self-definition, or selective interpretation by the reader. The CCJO should be absolutely clear about the most important JFC function.

4) How consistent are the Joint C2 Functional Concept and the C2 Joint Integrating Concept with the CCJO?

Since the CCJO sidesteps JC2, the answer to this question is open to interpretation. We conclude that the JC2 FC and C2 JIC are consistent with but conceptually ahead of the CCJO. From the consistency standpoint both documents support the CCJO three fundamental joint actions concepts. But the linkage between them is tenuous due to the aforementioned lack of clarity about JC2 in the CCJO. As a result, other less transformational but also still consistent functional concept and integration concept documents might also be seen as satisfying the murky JC2 ideas in the CCJO.

We believe the JC2 FC and C2 JIC are conceptually ahead of the CCJO because they clearly describe Information Age JC2 concepts. Because it lacks the same clarity, the CCJO could unintentionally be describing a very advanced Industrial Age approach to JC2 in which concepts like decentralization and collaboration and command structures are constrained relative to their meaning in the functional concept and integration concept. Indeed, the original, rather limited questions posed for this study reflected just such an interpretation of the document.

If the JC2 concepts embedded in the CCJO are in fact intended to be Information Age, the linkage between the CCJO, the JC2 FC, and C2 JIC (as well as the NCE JFC) can and should be made clearer and more explicit. This would remove leeway for erroneous interpretation and would sharpen the vision of the CCJO.

We conclude, then, that recommendations *are* appropriate and that this paper should include ideas for improving the JC2 dimension of the CCJO. At a minimum the CCJO should be explicit about the centrality of JC2 to the concept. Additionally the CCJO should contain sufficient explicit nuggets about its JC2 vision to prepare the ground for the JC2 FC and C2 JIC (even if retroactively). The next section examines options for doing both.

B. RECOMMENDATIONS

Our recommendations for improving the JC2 dimension of the CCJO for use in any future revision first seek to make the CCJO more explicit about the centrality of JC2 to the concept. Secondly, they are designed to clearly link the CCJO in the JC2 area to the JC2 FC and C2 JIC.

To highlight the centrality of JC2 to the concept an explicit statement of its primacy should be inserted up front in paragraph 2.A.2, “Unified Action,” and possibly supplemented in paragraph 2.D, “Assumptions.” This statement should reference and mirror the UNAAF assertion that JC2 is the most important function of the JFC. This would apply in each case below.

We divined three alternative options for further improving the JC2 dimension of the CCJO. Each is explained in general terms here with illustrative examples to show how the options differ. Each is developed in greater detail in appendix A.

The first option is the least intrusive of the three. This option entails inserting a paragraph on JC2 as the first subparagraph of Section 3.E., *Joint Issues Relevant to Both*

Adversarial Challenges and Nonadversarial Crisis Response Operations. This option would highlight the criticality of JC2 as a joint issue prior to the presentation of the central idea and fundamental joint actions.

The second option is the most intrusive of the three suggested possibilities. It would redraft the central idea and fundamental joint actions themselves to make the importance of JC2 explicit and would supplement that with a new CCJO appendix drawing on CCRP theory and JOpsC subordinate concepts.

Modifying the central idea as suggested leads to a concomitant change in the “Fundamental Joint Actions” presented in the CCJO. This “retooling” of the fundamental joint actions would first discuss JC2 followed by the other desired/enabled fundamental actions of knowledge, reach, and effects. This option would elevate JC2 to a position above knowledge, reach, and effects since each of these are dependent upon JC2.

The third option is moderately intrusive. It would sharpen the language in the current CCJO text as appropriate to explicitly acknowledge JC2 (vice “code words”) and would supplement that with footnotes referencing the JC2 FC and the C2 JIC as well as a new CCJO appendix E drawing on CCRP theory and JOpsC subordinate concepts.

- An example would be to make the following insertions:
- A discussion of future JC2 in the assumptions
- A JC2 reference in several parts of paragraph 3E, “Joint Issues”
 - 3.E.0, Introduction
 - 3.E.3, Interagency, Multinational and Other Partners
 - 3.E.4, Success Across the Range of Military Operations
- References to JC2 in the discussions of reach (section 4.C.1) and knowledge (section 4.C.2)

See appendix A of the present document for suggested text for all three options and a proposed new appendix (E) for options 2 and 3.

Appendix A

ALTERNATIVE APPROACHES TO IMPROVING THE JC2 CONTENT OF THE CCJO

Appendix A

ALTERNATIVE APPROACHES TO IMPROVING THE JC2 CONTENT OF THE CCJO

Note: In this proposed revision of the CCJO, the existing CCJO text is black, the proposed text is blue, and our explanatory text is green.

I. GENERAL (applies to all three alternatives):

2.A.2. Unified Action

Strategic objectives are determined in the context of the global situation and interaction with a variety of allies and other multinational partners. Achieving these objectives requires integrating joint force actions with those of interagency and perhaps multinational partners. This is the most important function undertaken by the Joint Force Commander¹ and is achieved through agile joint command and control. Although the future joint force must maintain a focus on waging and winning our Nation's wars, it must also be capable of supporting national efforts to shape the environment to prevent conflict. Likewise, should combat operations be necessary, the joint force must be able to fight and win while simultaneously facilitating transition to a state of peace and stability in which national interests can be sustained. Toward these ends, military power must be postured to enhance other instruments of national power. Specifically, the Department of Defense must be prepared to support other agencies in proactive engagement/theater shaping as well as post-crisis/conflict reconstruction operations. Conversely, during combat operations, the Defense Department will normally



Figure A-1. Unified Action

¹ JP 0-2, *Unified Action Armed Forces (UNAAF)*, p. III-13.

be the supported agency. In all cases, it is necessary to integrate all appropriate agencies and partners through unified action.

Figure A-1, [above](#), depicts the diplomatic, information, military, and economic instruments of national power focused through unified action [achieved in large part by the agile command and control approach used by the JFC](#). No one instrument is predominant; all are interrelated. Synergy and coherence are achieved through coordination and integration among the instruments as they are used to accomplish strategic objectives.

2 D. Assumptions

[See option 3, below, for suggested text that adds emphasis to the general statement made in 2.A.2 above.](#)

II. OPTION 1

3.E. *Joint Issues Relevant to Both Adversarial Challenges and Nonadversarial Crisis Response Operations.*

Regardless of the type of operation, the future joint force will require new capabilities and processes to help minimize the use of armed force and to most efficiently respond when necessary. This includes [first and foremost a flexible command and control approach appropriate to the mission and the situation](#). It also includes the need for engagement before and after warfighting/crisis response, the need for integrated involvement with interagency and multinational partners, and the need for multipurpose capabilities that can be applied across the range of military operations.

3.E.1. [\[New\] Flexible Joint Command and Control \(JC2\) is key to operating across the ROMO and effectively integrating interagency and multinational partners. The JFC must be able to assess his location on the ROMO and select a JC2 approach tailored to the problem set and resources at hand to ensure mission success while maintaining unity of effort and unity of command. This tailored approach will “exploit the benefits of decentralization—initiative, adaptability, and tempo—and achieve flexible synchronization.”² It will “be achieved through a collaborative information environment that enables cohesive teams, regardless of location to develop a shared understanding of commander’s intent and the battle-space \[knowledge\], thereby enabling superior](#)

² From JC2 Functional Concept, p. vi.

decision-making.”³ “The collaborative C2 functions give the C2 system its agility and give the commander flexibility in choosing a command methodology.”⁴

3.E.2. *Shaping Operations*

Maintaining peace and preventing conflict/crises are as important as waging major combat operations. Consequently, in addition to crisis response, the future joint force must be more involved in proactive engagement/crisis prevention....

III. OPTION 2

Replace the current *Central Idea* (4.A) with:

Highly adaptable Joint Command and Control (JC2) will empower the joint force to integrate its military capabilities with other elements of national and multinational power to conduct synchronized actions and to maintain the initiative in multiple domains concurrently in order to defeat adversaries or control situations in order to achieve strategic objectives.

Replace *Fundamental Joint Actions* (4.C) with:

To enable accomplishment of its particular objectives, the joint force, other agencies and multinational partners must take many actions. However, central to all other actions is Joint Command and Control. The singular function of JC2 is to organize and “integrate efforts in time, space and purpose to create a desired change in the operational environment or prompt a desired action by an adversary or others.”⁵ Flexible JC2 creates unified action by integrating efforts with other agencies and partners. Such commonality permits a more coordinated and therefore more effective national effort.

In order to accomplish the assigned mission, regardless of where on the ROMO the mission is and what operational environment and conditions are at hand, the Joint Force Commander is dependent on identifying actions (i.e., acquiring, refining, and sharing knowledge) that will have the greatest likelihood of creating desired effects and bringing actions to bear (through establishing, expanding, and securing reach) by integrating joint capabilities with those of other instruments of national and multinational power to create and exploit effects.

Joint C2 must have essentially all of the same “characteristics” required of the joint force writ large as outlined in Section 4.E, below. In particular, Joint C2 must be “agile.” Agility is the central characteristic needed to “operate with sufficient speed and quality of decisionmaking to operate

³ From JC2 Functional Concept, p. vi.

⁴ From JC2 Functional Concept, p. 14.

⁵ From CCJO, p. 14.

within an adversary’s decision-making cycle.” Agile Joint C2 “will enable commanders to better deal with the uncertainty, complexity, and dynamism of the future operating environment.”⁶ The implication is obvious – there is no single C2 approach that can or should be used in every operation reflected in the ROMO. Taking this one step further, no single C2 approach is applicable to or appropriate for use in every circumstance within (during) any particular operation.

Agile Joint Command and Control enables the three Fundamental Actions taken by the joint force: *[Note: The reordering below more clearly shows the relationship between them. There is no intent to reword the current text.]*

- Acquire, refine, and share knowledge
- Establish, expand, and secure reach
- Identify, create, and exploit effects

The joint force will employ these actions in every campaign, varying the focus and intensity of each as situations change....

IV. OPTION 3

Make the following insertions:

1. Page 4:

2.D. Assumptions.

For the purpose of this concept, an assumption is considered appropriate if it meets the following criteria: 1) It should be a likely future condition, but not a certainty; 2) It should be beyond the purview of the concept; and 3) It should be necessary for the concept to be valid. The CCJO assumes the following:

- Fundamental objectives of current national strategy will remain applicable in 2012-2025.
- The joint force will:
 - 1) **retain** a diverse set of capabilities inherent in the various services and other organizations that comprise the force; and
 - 2) **build on its current capacity** to integrate those capabilities in pursuit of a common aim **through an agile Joint Command and Control capability**.

⁶ From JC2 Functional Concept, p. 8.

That is, the joint force will maintain a broad variety of means it can employ to achieve a wide range of results, [with an appropriate range of JC2 approaches that](#) can effectively integrate its actions to achieve a high level of unity of effort [depending on the actual mission and the operating environment](#).

- Military, political and social entities and situations are complex, adaptive “systems.”
- The JOE accurately describes the most likely security environment in the 2012-2025 timeframe.

2. Page 8:

3.E. *Joint Issues Relevant to Both Adversarial Challenges and Nonadversarial Crisis Response Operations.*

Regardless of the type of operation, the future joint force will require new capabilities and processes to most efficiently respond and [to most effectively conduct operations](#) when necessary. [Chief among these is command and control. “The implications for Joint C2 in the context of the new operational challenges and the changing character and conduct of warfare and conflict resolution require a fundamental shift in the way that the U.S. military undertakes command and control.”⁷](#) The future joint force will also need: [the capability to conduct engagement activities](#) before and after warfighting/crisis response; the [capability](#) for [integration](#) with interagency and multinational partners; and [other](#) multipurpose capabilities that can be applied across the range of military operations.

3. Page 9:

3.E.3. *Interagency, Multinational, and Other Partners.*

Leveraging capabilities of interagency and multinational partners to address security challenges is desirable and increasingly important. However, multi-participant operations in the envisioned environment may exacerbate already significant interoperability challenges and complicate cooperation strategies. Additionally, future joint force operations will likely require interaction with any number of private, nongovernmental, regional and international organizations. Each organization brings its own (sometimes unique) equipment and procedures and its own, (sometimes supporting, sometimes competing) priorities, resulting in additional interoperability and operational integration challenges for the joint force. [These challenges are met through agile Joint](#)

⁷ [From JC2 Functional Concept, p. 8.](#)

Command and Control systems and approaches that allow tailoring to incorporate all partners.

4. Page 10:

3.E.4. *Success Across the Range of Military Operations (ROMO).*

The ROMO in which the future joint force will be expected to succeed is depicted in Figure 3. [Graphic omitted without intent to delete.] This figure reflects both adversary-focused and humanitarian nonadversary operations in which the future joint force is expected to engage. The United States will remain continuously engaged across the globe in a continuum ranging from peace and stability (maintained by shaping and deterrent activities), through conflict to reconstruction, with a goal of maintaining or returning to a state of peace and stability in which US national Security interests are assured. The joint force commander's (JFC) ability to integrate various operations in the right proportion [through agile Joint Command and Control](#) is key to achieving desired strategic outcomes. The uncertain environment combined with the scope of different operations will demand capabilities, [particularly Joint Command and Control, which](#) are adaptable and can be applied in multiple types of operations simultaneously. Resource constraints alone will prevent an indefinite number of simultaneous effective responses across the ROMO.

5. Page 12:

4.C.1. *Establish, expand, and secure reach.*

[In order to accomplish the assigned mission, regardless of where on the ROMO the mission is and what operational environment and conditions are at hand, the joint force commander brings actions to bear through establishing, expanding, and securing reach by integrating joint capabilities with those of other instruments of national and multinational power to create and exploit effects. The singular function of joint command and control is to organize and “integrate these capabilities in time, space and purpose to create a desired change in the operational environment or prompt a desired action by an adversary or others.”⁸ Flexible JC2 creates unified action by integrating efforts with other agencies and partners.](#)

[Reach](#) describes the ability of the joint force to access, coordinate and employ essential capabilities available inside and outside the operational area to shape an

⁸ From CCJO, p. 14.

environment, deter or defeat an adversary, resolve crises, or support other strategic objectives.

6. Page 13:

4.C.2. *Acquire, refine, and share knowledge.*

This action describes the ability of the JFC to work within and across national and international sources to build and sustain the knowledge necessary to identify required actions and assess effects. *The acquisition, refinement, and sharing of knowledge is both a function of and a product of the JFC's selected approach to Command and Control.*

The better we understand our own forces and capabilities, the adversary and the environment, the better we can employ and integrate joint force actions to create decisive effects...

V. PROPOSED NEW CCJO APPENDIX E

(Applies to Options 2 and 3)

The preceding suggested options provide, by design, three possible ways to ensure that the text of the current version of the CCJO contains at least minimal appropriate JC2 content. However, because we believe JC2 is central to the CCJO, we propose adding a separate appendix that presents a more complete picture of future joint command and control than we have offered for the main body of the text. This appendix would be an intermediate level discussion that expands on the CCJO ideas without delving into the details appropriate to the subordinate concept documents such as the JFCs and JICs.

The following text contains the content of the proposed additional appendix to the CCJO.

APPENDIX E. FUTURE JOINT COMMAND AND CONTROL

Mission accomplishment is a commander's ultimate goal. Achieving that goal is dependent on creating desired effects at the right time and at the right place. In order to do that, the joint force commander employs a seamless and deployable command and control capability, which includes skilled personnel, trained in joint operations and adaptable SOPs. In short, the JFC depends totally on command and control to accomplish the mission.

By design, the references to joint command and control (JC2) in the main body of the CCJO are intended to provide only minimum necessary information to convey a

broad concept. The purpose of the Joint Functional and Joint Integrating Concepts dealing with command and control and net-centric operations are to expand upon and discuss in depth these JC2 ideas. However, there is value in presenting here a more complete picture of future joint command and control than is provided in the main body of the CCJO. This appendix is an intermediate-level discussion that expands on the CCJO ideas without delving into the details appropriate to subordinate documents.

The following broad discussion of C2 theory and concepts for the future makes the case for altering the normal current approach to command and control. It clarifies the primary attribute of future command and control and why it is not only desired, but in fact is necessary.

A. What is Command and Control?

According to Joint Publication 1-02, the *DoD Dictionary of Military and Associated Terms*, “command and control” is “the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission...”⁹

It is important to emphasize that command and control is not an end in itself, but it is a means toward creating value (e.g., the accomplishment of a mission). Specifically, Command and Control is about focusing the efforts of a number of entities (individuals and organizations) and resources, including information, toward the achievement of some task, objective, or goal.¹⁰

B. Why Do We Need to Place Heavy Emphasis on C2 in the Future?

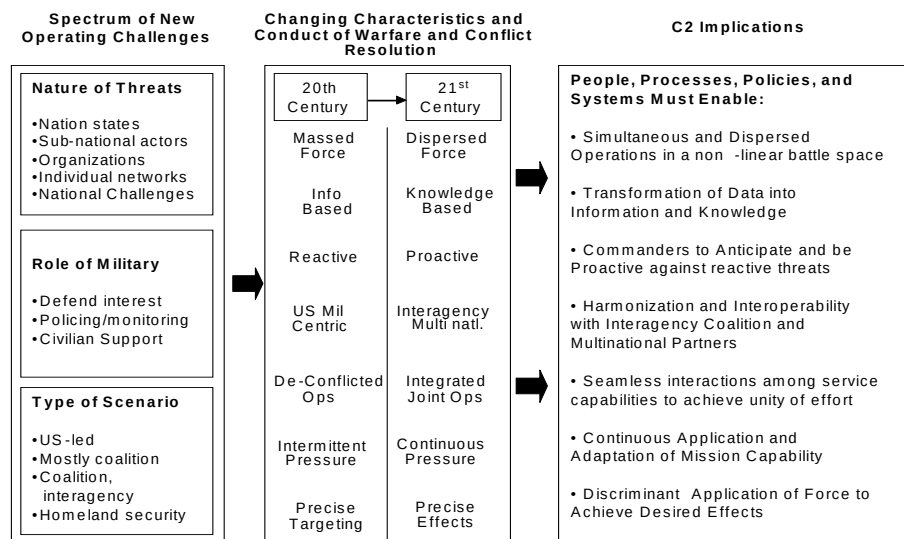
According to the JP 0-2, “it is the most important function undertaken by a JFC. It is ... the means by which a joint force commander synchronizes and/or integrates joint force activities in order to achieve unity of command and unity of effort. [Command and control (C2)] ties together all the operational functions and tasks, and applies to all levels of war and echelons of command across the range of military operations.”¹¹

As outlined in the CCJO, the future joint force will have characteristics and be required to act in situations and in ways potentially very different from today. The future joint force will need command and control that is equally different. (See figure A-2.)

⁹ JP 1-02, p. 101.

¹⁰ Albert’s, *Understanding Command and Control* p. 32.

¹¹ JP 0-2, Unified Action Armed Forces (UNAAF), p III-13.



Source: JC2 FC, p. 9.

Figure A-2. Operational Challenges and C2 Implications

As the technology, the nature of warfare, military capabilities, and operational environments continue to evolve, it is clear that C2 must evolve as well. According to one leading C2 theorist, “New C2 Approaches are the fulcrum of an Information Age transformation of the DoD and understanding command and control is among the most important and urgent tasks we have on the critical path to transformation and the ability to meet 21st century mission challenges.”¹² He goes on to state: “Today’s missions differ from traditional military missions, not just at the margins, but qualitatively. Today’s missions are simultaneously more complex and more dynamic, requiring the collective capabilities and efforts of many organizations in order to succeed. This requirement for assembling a diverse set of capabilities and organizations into an effective coalition is accompanied by shrinking windows of response opportunity. Traditional approaches to command and control are not up to the challenge. Simply stated, they lack the agility required in the 21st century.”¹³ In other words, there are major discontinuities between the command and control concepts and practices being taught and practiced today and those that will be required tomorrow.

In summary, continued reliance on current C2 capabilities will not provide the agility or ability to make good decisions in complex and uncertain environments. Additionally, it will not facilitate collaboration with interagency and multinational

¹² Alberts, p.3.

¹³ Alberts, p. 1.

partners needed in the future operating environment. The end result would be unacceptable risk of mission failure in future joint, interagency, and multinational operations.¹⁴

C. What Can Be Done?

“Given that complexity increases risk in military operations, it is important that we understand what can be done to counter the adverse effects of the increased complexity that accompanies 21st century operations.”¹⁵ Successful command and control of the future joint force is predicated on the ability “to make timely, effective responses to an altered and/or unforeseen operating environment. Such operating environment changes, often caused by adversary actions, *may require modifying organizational structures, workflows, and decision-making processes.*” [emphasis added.]¹⁶

In simpler terms, the internal and external particulars of any given mission may call for a change in the commander’s (at any level) overall approach to command and control—the future commander will select an approach and adapt the organization and functioning of C2 to the situation and circumstances at hand. Obviously, it is incumbent on the commander to have the skills and insights necessary to recognize this “need.” Assuming that ability exists, “the question, of course, is which C2 approach(es) are better suited to complex situations with their increased degree of uncertainty and increased levels of risk? The answer is, of course, C2 approaches that (1) are agile and (2) take full advantage of all of the available information and assets. The second of these enables us to reduce uncertainties when and where we can, while the first allows us to deal with the residual uncertainty.”¹⁷

The fundamental joint actions and several characteristics of the joint force envisioned in the CCJO are very much a function of and dependent upon the C2 approach options available to a commander. Recent theoretical work describes the underpinnings for a future JC2 capability that would maximize knowledge empowerment, interoperability, flexibility, agility, tailorability, and resiliency of JC2 and, by extension, the joint force as a whole.

¹⁴ Adapted from C2 JIC, p.15.

¹⁵ Alberts p. 205.

¹⁶ C2 JIC, p. 28.

¹⁷ Alberts, p. 205.

Our current approach to C2 is basically only a single point in a much larger C2 space, ranging from current practice at the lower left-hand corner and a totally self-synchronized arrangement at the theoretical opposite corner. Figure A-3 illustrates this space, bounded by the three fundamental dimensions that define the essence of C2.¹⁸

- Allocation of decision rights (who can make what decisions) is their distribution within an enterprise or an organization. At one end of the spectrum is total centralization, where all the rights are held by a single actor. At the other end is total decentralization, where every entity has equal rights in every decision.
- Patterns of interaction (who can interact with whom and to what degree) comprise three elements: reach (the number and variety of participants); richness (the quality of the contents); quality of interactions enabled. In other words: who is “on the net,” what is the quality of their information, and how well can they collaborate?
- Distribution of information (who has what information and how is it shared) is impacted by the distribution of decision rights (which includes who makes the choices about information distribution processes and the creation of the infrastructure by which information is shared and collaboration is carried out, as well as who is entitled to what information) and the patterns of interaction (who is able to acquire what information).

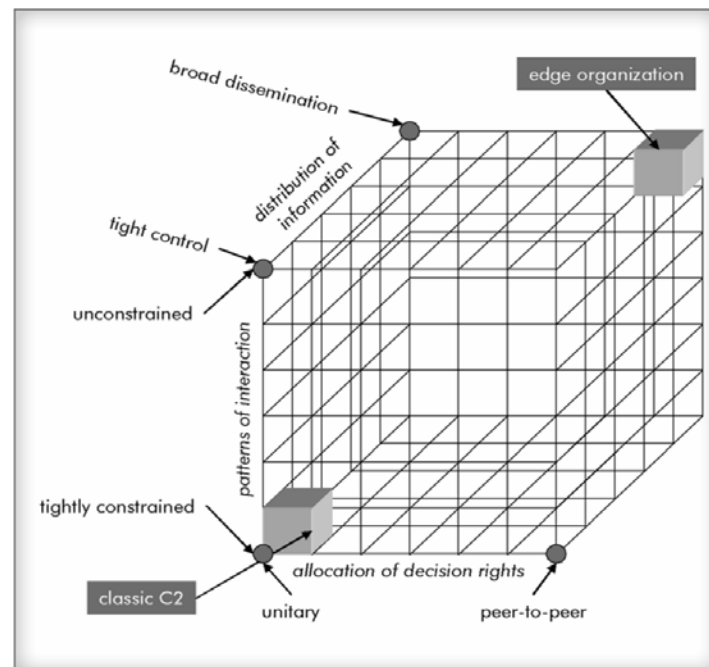


Figure A-3. The C2 Space

¹⁸ Alberts, p. 75.

When we talk about “C2 approaches” we mean organizations and procedures enabled by technical means. It is important to always keep in mind that there are many different approaches to accomplishing these functions. No specific approach or set of approaches defines what command and control means. Not only are different C2 approaches appropriate for different sets of purposes or circumstances, but different approaches may be taken by different sets of entities in an enterprise, and may change over time.¹⁹

It is important to note that “the fundamental dimensions determining a C2 approach are not static. They vary across at least two dimensions: function and time. ... Indeed, dynamics across the three fundamental dimensions of the C2 approach and the ability of a particular force to operate differently over time and across function are key indicators of the capacity for agility. In particular, the capacity for adaptation (change in organization and work process in response to differing conditions in the operating environment) is directly reflected in the range of C2 approaches a given force is capable of adopting. In the Industrial Age force, this range [has been] relatively narrow because it [was] optimized against a particular type of adversary and set of battlespace conditions. In more Information Age forces, a wide range of C2 approaches is enabled by the types of personnel, training, technologies, leadership, organization, and doctrine employed. These more agile forces also have the ability to recognize a need or opportunity to make meaningful adaptations and to act efficiently.”²⁰

D. Characteristics of Joint Command and Control

“Given the complexity of the 21st century security environment and the missions that 21st century militaries are and will be called upon to accomplish, C2 agility is perhaps the most important attribute of a C2 Approach.”²¹ A Joint C2 system that lacks agility is largely inadequate to deal with the challenges of the future operating environment. Agility is not merely **an** attribute of the C2 system it is the *Overarching Attribute*, one that permeates all aspects of the force.²²

¹⁹ Adapted from Alberts p. 8-9.

²⁰ Adapted from SAS 050, p. 13.

²¹ Alberts p. 57.

²² Adapted from JC2FC p 10 & p21.

In 2015, Joint C2 will be agile across the range of military operations. Joint forces, interagency, multinational partners, and nongovernmental organizations will be able to rapidly respond and decisively execute commanders' intent in a complex, uncertain, and dynamic operating environment. C2 processes will be performed collaboratively to improve the speed and quality of the individual decisions and allow for the rapid and continuous synchronization of multiple decisions to achieve unity of effort. Commanders will rapidly tailor their C2 capabilities to any situation and will be able to exploit the benefits of decentralization—initiative, adaptability and tempo—and achieve flexible synchronization without sacrificing unity of command. This will be achieved through a collaborative information environment that enables cohesive teams, regardless of location, to develop a shared understanding of commander's intent and the battlespace, thereby enabling superior decisionmaking.”²³

Three words of caution. First, joint command and control based on the concepts described here, and reflected in the C2 JIC & JC2FC, will require a major (perhaps, revolutionary) change in the cultural mindset in individuals at all organizational levels. The evolution of technology will increase the volume of information, bringing with it the potential to inundate the warfighter with unneeded information. In addition, because upper-echelon commanders will have better and faster access to information and knowledge, they may be prone to micromanaging subordinates. Together, this can result in an increase in decision time and potentially reducing flexibility and effectiveness in rapidly exploiting tactical opportunities on the battlefield. The evolution of military culture in individuals and organizations may not occur quickly enough to allow the military to fully leverage advancements in future information technologies.²⁴

Second, “Joint C2 in 2015 will rely heavily on information technology focused on supporting humans in exercising uniquely human qualities such as leadership, judgment, and understanding.”²⁵ In other words, future joint command and control is about organizations and processes enabled by technical systems. Both aspects need to evolve from what currently exists, but of these two, the evolution of the human aspect of C2 must be primary—in particular, the command function must remain paramount. As C2 theorists point out, “*correct* organizations and procedures [and commanders] can sometimes overcome limits in technical means, and conversely, *wrong* organizations and

²³ JC2FC, p. 1.

²⁴ Adapted from JC2FC, p. 5.

²⁵ Adapted from JC2FC, p. 5.

procedures [and commanders] can negate capabilities proffered by technical means.”²⁶ That said, one critical aspect on the technical side is Information Assurance. “If Information Assurance is not achieved and maintained, the ability to take advantage of Joint C2 capabilities could be significantly degraded.”²⁷

Third, the infrastructure and tools to support agile C2 must be explored, developed, tested and iteratively sustained. Artificial agents to support human information needs cannot be developed without user interface, experimentation and exercise. The volume and breadth of deployment of activities and support agents coupled with the many approaches and decentralized execution of command mandate some visibility and overwatch to avoid the disaster of unintended conflict. The system needs visibility and configuration management to function and the commander needs visibility for mission accomplishment and accountability. The infrastructure can support both, but it must be planned for and implemented.

VI. SUMMARY

Command and control is the ability to recognize what needs to be done in a situation and to ensure that effective actions are taken. At its core, command and control is about decisionmaking and the individuals who make decisions. In 2015 Joint C2 will be a joint decisionmaking process that is dynamic, decentralized, distributed, deployable, and highly adaptive. Enabled by a collaborative information environment, skilled joint planners and adaptable SOPs, Joint C2 will provide the Joint Force Commander an ability to have a networked, dispersed, joint force that can work together in a virtual problem space, accessing any piece of information, any place and at any time, in response to any operation across the ROMO.

This approach to command and control reaps the benefits of decentralization—initiative, adaptability, and tempo—without sacrificing the coordination and unity of effort typically associated with centralization. With better mutual understanding and appreciation for the larger situation, subordinate commanders will be able to act with initiative, confident in their understanding of the higher commander’s, and others’, designs. This would increase tempo and adaptability. Commanders and staffs will be able to employ a spectrum of C2 approaches, including self-synchronization rather than using

²⁶ Alberts, p. 8.

²⁷ Adapted from JC2FC, p. 5.

a standardized approach focused on centralized planning and coordination, which generally must occur at the expense of flexibility and tempo.

This type of command and control environment supports implicit understanding and communication across the full extent of the organization. Previously this high level of intuitiveness was generally possible only in small, cohesive groups, and certainly never between staffs or within joint formations. This concept offers the possibility of achieving small-unit dynamics across the full breadth and depth of the joint force.²⁸

²⁸ The Summary is excerpted verbatim from JC2FC, p. 19.

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Appendix B

GLOSSARY

Appendix B

GLOSSARY

ADCON	Administrative Control
AI	Artificial Intelligence
ATC	Advanced Technology Concepts
BA	Battlespace Awareness
BG	Brigadier General
C2	Command and Control
C2 JIC	Command and Control Joint Integrating Concept
C2CPM	Command and Control Capability Portfolio Management
C2JCD	Command and Control Joint Capabilities Document
CCJO	Capstone Concept for Joint Operations
CCRP	Command and Control Research Program
CDAC-PAK	Combined Disaster Assistance Center
CENTCOM	United States Central Command
CES	Core Enterprise Services
CFACC	Combined Forces Air Component Commander
CFC-A	Combined Forces Command Afghanistan
CFLCC(F)	Combined Forces Land Component Commander (Forward)
CFLCC	Combined Forces Land Component Commander
CFMCC	Combined Forces Maritime Component Commander
CFSOCC	Combined Forces Special Operations Component Commander
CJCSM	Chairman Joint Chiefs of Staff Memorandum
CJFACC	Combined Joint Forces Air Component Command
CJFLCC	Combined Joint Forces Land Component Command
CJFMCC	Combined Joint Forces Land Component Command
CJTf-HOA	Combined Joint Task Force-Horn
CMD	Command
CMOC	Combined Maritime Operations Center
COCOM	Combatant Command
CONOPS	Concept of Operations
CPOF	Command Post of the Future

CSAs	Combat Support Agencies
DARPA	Defense Advanced Research Program Agency
DARPA PM	Defense Advanced Research Program Agency Program Manager
DoD	Department of Defense
DoDD	Department of Defense Directive
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities
DPS	Defense Planning Scenarios
FC & IC	Functional Concept and Integrating Concept
FOUO	For Official Use Only
GIG	Global Information Grid
GoP	Government of Pakistan
GWOT	Global War on Terrorism
HN	Host Nation
HQ	Headquarters
IA	Interagency
IDA	Institute for Defense Analyses
IGO	Intergovernmental Organizations
IM	Information Management
IO	Information Operations
ISR	Intelligence, Surveillance, and Reconnaissance
IT	Information Technology
J7	Directorate for Operational Plans and Joint Force Development
J8	Directorate for Resources and Requirements
J9	Directorate for Joint Innovation and Experimentation
JAOC	Joint Air Operations Center
JAWP	Joint Advance Warfighting Program
JBMC2	Joint Battle Management Command and Control
JC2	Joint Command and Control
JC2FC	Joint C2 Functional Concept
JETCD	Joint Experimentation, Transformation and Concepts Division
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFCOM	United States Joint Forces Command
JFLCC	Joint Force Land Component Commander
JFMCC	Joint Force Maritime Component Commander

JI&E	Joint Innovation and Experimentation
JIATF	Joint Interagency Task Force
JIC	Joint Operating Concept
JMO	Joint Maritime Operations
JOA	Joint Operations Area
Joint CDE CPLAN	Joint Concept Development Experimentation Campaign Plan
JOPEs	Joint Operation Planning and Execution System
JOpsC	Joint Operations Concepts
JOpsC-DP	Joint Operations Concepts Development Process
JP	Joint publication
JS	Joint Staff
JSOTF	Joint Special Operations Task Force
JTF	Joint Task Force
LIFELINE	Relief operations in the wake of the October 2005 earthquake in Pakistan
LNO	Liaison Officer
MAGTF	Marine Air-Ground Task Force
MCO	Major Combat Operation
METT-T	Mission, Enemy, Terrain, Troops & Time Available
MOOTW	Military Operations Other Than War
MSFD	Multi Service Force Deployment
NATO	North Atlantic Treaty Organization
NCO CF	Network Centric Operation Conceptual Framework
NCOE	Net-Centric Operational Environment
NECC/JCCD	Joint Combat Capability Developer
NGOs	Nongovernmental Organizations
NMCS	National Military Command System
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OPCON	Operational Control
OPTEMPO	Operating/Operations Tempo
OSD	Office of the Secretary of Defense
PVO	Private Voluntary Organization
RADM	Rear Admiral
ROMO	Range of Military Operations

SA	Situational Awareness
SAS 050	Studies, Analysis and Simulation 050 Panel
SecDef	Secretary of Defense
SJFHQ	Standing Joint Force Headquarters
SOPs	Standard operating Procedures
TACON	Tactical Control
TF	Task Force
TTP	Tactics, Techniques, and Procedures
UJTL	Universal Joint Task List
UK	United Kingdom
UN	United Nations
UNAAF	Unified Action armed Forces
UR 2015	Urban Resolve Experiment
US	United States
USAID	United States Agency for International Development
USG	United States Government
WFC	Warfighter Challenges
WWI	War World I
WWII	War World II

Appendix C

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Appendix C

BIBLIOGRAPHY

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RECENT JOINT EXPERIMENTS

(Note: The text highlighted in bold shows specifically where the synopsis author (most likely the event director) drew a direct or indirect linkage with the CCJO and/or the JOpsC family of concepts.)

GLOBAL DETERRENCE; Develop a series of combating weapons of mass destruction and global deterrence experimentation events that provide a forum to **explore integration and synchronization of US government efforts.**

UNIFIED QUEST 2006; Multi-faceted event with numerous spirals exploring subjects such as alternative approaches for the **design of campaigns and** operations to determine their utility in irregular warfare and **the Joint Operating environment.**

URBAN RESOLVE 2015; **Inform the JUO Concept and other Joint & Service concepts** and provide potential solutions that measurably improve the Joint Force Commander's ability to isolate & control the urban battle space...Any DOTML-PF solution that remedies a capability gap/shortfall [that]: ...**Supports** the joint force vision and **characteristics of the Capstone Concept for Joint Operations.**

JOINT URBAN WARRIOR 2006; **Examine Urban Operations** with focus on: 1) Three Block War; 2) Coalition and Interagency contributions; 3) Application to Homeland Security and Defense.

UNIFIED ENGAGEMENT 2006; Central theme: Meeting the challenges of joint and combined combat operations in the future integrated globalized environment. Objectives: Advance the state of strategic and operational thought relative to the future globalized world (**assess, modify and improve needed USAF and Joint capabilities and CONOPs**).

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Appendix D

UJTL C2 Tasks

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UJTL C2 TASKS

ST 5. PROVIDE THEATER STRATEGIC COMMAND & CONTROL, COMMUNICATIONS, AND COMPUTERS (C4) -- To exercise authority and direction by a combatant commander over assigned and attached joint and multinational forces. For combatant commanders, this is the exercise of combatant command (command authority). This task includes the development and revision of theater strategy, based upon national security strategy and national military strategy. A theater strategy is designed to link strategic and operational strategies to attain a desired strategic end state by matching objectives, threats, and opportunities in light of resource constraints. The geographic combatant commander provides strategic guidance and direction for the employment of single service, joint, and multinational forces through both the theater strategy and campaign plans. The result of the three levels of strategy (and related strategic plans) is an integration of national and military ends, ways, and means as well as theater ends, ways, and means. The combatant commander provides C4 policy, plans, programs, and systems to shape the environment and ensure information superiority and interoperable C4 systems. These activities pertain across the range of military operations. If in support of homeland security, spectrum restrictions may apply.

ST 5.1 OPERATE and MANAGE THEATER C4I ENVIRONMENT

ST 5.1.1 COMMUNICATE STRATEGIC and OPERATIONAL DECISIONS and INFORMATION

ST 5.1.1.1 MANAGE A THEATER COMMUNICATIONS SECURITY (COMSEC) MANAGEMENT BRANCH

ST 5.1.1.2 SUPPORT JOINT OPERATIONS CENTER (JOC) OPERATIONS

ST 5.1.2 DETERMINE and MANAGE THEATER C4I SYSTEMS REQUIREMENTS

ST 5.1.2.1 MANAGE PROGRAMS, RESOURCES, and REQUIREMENTS TO SUPPORT A C4ISR ARCHITECTURE

ST 5.1.2.2 MAINTAIN A JOINT FREQUENCY MANAGEMENT OFFICE

ST 5.1.2.3 MANAGE INFORMATION ASSURANCE POLICIES

ST 5.1.2.4 MANAGE A THEATER COMMUNICATIONS CONTROL CENTER

ST 5.1.3 MAINTAIN STRATEGIC INFORMATION, DATA, and FORCE STATUS

ST 5.1.4 MONITOR WORLDWIDE and THEATER STRATEGIC SITUATION

ST 5.1.5 PROVIDE FOR COMBAT CAMERA IN THEATER

ST 5.1.6 ESTABLISH INFORMATION ASSURANCE (IA) PROCEDURES

ST 5.1.7 DEVELOP and MANAGE THEATER SPECTRUM USE

ST 5.1.8 PROVIDE FOR HISTORICAL DOCUMENTATION IN THEATER

ST 5.1.9 ESTABLISH and COORDINATE POSITIVE IDENTIFICATION PROCEDURES FOR FRIENDLY FORCES IN THEATER

ST 5.2 ASSESS THEATER STRATEGIC ENVIRONMENT

ST 5.2.1 REVIEW CURRENT SITUATION

ST 5.2.2 ASSESS NATIONAL and MULTINATIONAL STRATEGY

ST 5.2.3 REVIEW NATIONAL SECURITY CONSIDERATIONS

ST 5.2.4 REVIEW INTERNATIONAL SECURITY CONSIDERATIONS

ST 5.2.5 PROJECT FUTURE COMBATANT COMMAND CAMPAIGNS OR STRATEGIC OPERATIONS

ST 5.3 DETERMINE STRATEGIC DIRECTION

ST 5.3.1 CONDUCT STRATEGIC ESTIMATES

ST 5.3.1.1 DEVELOP THEATER COURSES OF ACTION and PREPARE STAFF ESTIMATES

ST 5.3.1.2 ANALYZE and COMPARE THEATER COURSES OF ACTION

ST 5.3.1.3 SELECT/MODIFY THEATER COURSE OF ACTION AND PREPARE COMMANDER'S ESTIMATE

ST 5.3.1.4 CONDUCT MISSION ANALYSIS and PREPARE MISSION STATEMENT

ST 5.3.2 DEVELOP THEATER STRATEGIC CONCEPTS

ST 5.3.3 ISSUE PLANNING GUIDANCE

ST 5.3.4 PREPARE and COORDINATE THEATER STRATEGY, CAMPAIGN PLANS OR OPERATION PLANS, and ORDERS

ST 5.4 PROVIDE STRATEGIC DIRECTION TO THEATER FORCES

ST 5.4.1 ISSUE THEATER STRATEGIC OPERATION PLANS, ORDERS, and ROE

ST 5.4.2 SYNCHRONIZE JOINT OPERATIONS and SUBORDINATE CAMPAIGN PLANS

ST 5.4.3 ESTABLISH OR PARTICIPATE IN A JOINT, COMBINED, OR MULTINATIONAL FORCE

ST 5.4.3.1 AUGMENT THE JOINT FORCE STAFF

ST 5.4.3.1.1 PROVIDE CONTRACT MANAGEMENT LIAISON

ST 5.4.3.2 ACTIVATE COMBATANT COMMAND BOARDS, CENTERS, CELLS and BUREAUS

ST 5.4.3.3 DEVELOP JOINT FORCE LIAISON STRUCTURE

ST 5.5 CONDUCT THEATER-WIDE INFORMATION OPERATIONS (IO)

ST 5.5.1 PLAN and INTEGRATE THEATER-WIDE INFORMATION OPERATION (IO)

ST 5.5.2 CONTROL THEATER INFORMATION OPERATIONS (IO)

ST 5.5.3 ESTABLISH and MONITOR THEATER INFORMATION SECURITY POLICY, PLANS, PROGRAMS, and DIRECTION

ST 5.6 DEVELOP and PROVIDE PUBLIC AFFAIRS IN THEATER

ST 5.6.1 PLAN and PROVIDE FOR EXTERNAL MEDIA SUPPORT and OPERATIONS

ST 5.6.2 COORDINATE COMMAND/INTERNAL INFORMATION PROGRAMS

ST 5.6.3 PLAN and CONDUCT COMMUNITY RELATIONS PROGRAM

OP 5. PROVIDE OPERATIONAL COMMAND & CONTROL (C2) -- To exercise authority and direction by a JFC over assigned and attached joint and multinational forces in the accomplishment of the mission. Provides operational guidance, direction, and vision to assigned forces. Follows the theater strategy and links operational and tactical end states. JFCs employ assigned single service, joint and multinational forces to accomplish assigned missions. When directed, a JFC will standup a joint task force to plan, direct, and coordinate operations. JFCs may develop and execute policies, plans, and programs. They provide interoperable C4 systems support for joint operations. This

task is applicable across the range of military operations, including MOOTW.OP 5.1 ACQUIRE and COMMUNICATE OPERATIONAL LEVEL INFORMATION and MAINTAIN STATUS

OP 5.1.1 COMMUNICATE OPERATIONAL INFORMATION

OP 5.1.2 MANAGE MEANS OF COMMUNICATING OPERATIONAL INFORMATION

OP 5.1.3 DETERMINE COMMANDER'S CRITICAL INFORMATION REQUIREMENTS

OP 5.1.4 MAINTAIN OPERATIONAL INFORMATION and FORCE STATUS

OP 5.1.5 MONITOR STRATEGIC SITUATION

OP 5.1.6 PRESERVE HISTORICAL DOCUMENTATION OF JOINT/COMBINED OPERATIONS OR CAMPAIGNS

OP 5.1.7 COORDINATE COMBAT CAMERA ACTIVITIES

OP 5.1.8 EXECUTE C4 POLICIES and PROCEDURES FOR THE JOINT OPERATIONS AREA

OP 5.1.9 COORDINATE INFORMATION ASSURANCE (IA) PROCEDURES

OP 5.1.10 IMPLEMENT ELECTROMAGNETIC SPECTRUM MANAGEMENT, POLICY, PLANS, PROGRAMS, and DIRECTION

OP 5.1.11 PROVIDE POSITIVE IDENTIFICATION OF FRIENDLY FORCES WITHIN THE JOINT OPERATIONS AREA

OP 5.2 ASSESS OPERATIONAL SITUATION

OP 5.2.1 REVIEW CURRENT SITUATION (PROJECT BRANCHES)

OP 5.2.2 FORMULATE CRISIS ASSESSMENT

OP 5.2.3 PROJECT FUTURE CAMPAIGNS and MAJOR OPERATIONS (SEQUELS)

OP 5.3 PREPARE PLANS and ORDERS

OP 5.3.1 CONDUCT OPERATIONAL MISSION ANALYSIS

OP 5.3.2 ISSUE PLANNING GUIDANCE

OP 5.3.3 DETERMINE OPERATIONAL END STATE

- OP 5.3.4 DEVELOP COURSES OF ACTION/PREPARE STAFF ESTIMATES
- OP 5.3.5 ANALYZE COURSES OF ACTION
- OP 5.3.6 COMPARE COURSES OF ACTION
- OP 5.3.7 SELECT OR MODIFY COURSE OF ACTION
- OP 5.3.8 ISSUE COMMANDER'S ESTIMATE
- OP 5.3.9 PREPARE CAMPAIGN OR MAJOR OPERATIONS and RELATED PLANS AND ORDERS
- OP 5.4 COMMAND SUBORDINATE OPERATIONAL FORCES
 - OP 5.4.1 APPROVE PLANS AND ORDERS
 - OP 5.4.2 ISSUE PLANS AND ORDERS
 - OP 5.4.3 PROVIDE RULES OF ENGAGEMENT
 - OP 5.4.4 SYNCHRONIZE and INTEGRATE OPERATIONS
 - OP 5.4.5 COORDINATE/INTEGRATE COMPONENTS, THEATER, and OTHER SUPPORT
 - OP 5.4.6 CONDUCT OPERATIONAL REHEARSALS
- OP 5.5 ESTABLISH, ORGANIZE, and OPERATE A JOINT FORCE HEADQUARTERS
 - OP 5.5.1 DEVELOP A JOINT FORCE COMMAND and CONTROL STRUCTURE
 - OP 5.5.2 DEVELOP JOINT FORCE LIAISON STRUCTURE
 - OP 5.5.3 INTEGRATE JOINT FORCE STAFF AUGMENTEES
 - OP 5.5.4 DEPLOY JOINT FORCE HEADQUARTERS ADVANCE ELEMENT
 - OP 5.5.5 ESTABLISH COMMAND TRANSITION CRITERIA and PROCEDURES
 - OP 5.5.6 ESTABLISH OR PARTICIPATE IN TASK FORCES
 - OP 5.5.7 CONDUCT JOINT FORCE STAFF OPERATIONS
 - OP 5.5.8 PROVIDE JOINT FORCE STAFF FACILITIES and EQUIPMENT

OP 5.5.9 ESTABLISH A JOINT MISSION ESSENTIAL TASK LIST (JMETL)
FOR A JOINT FORCE

OP 5.6 COORDINATE OPERATIONAL INFORMATION OPERATIONS (IO)

OP 5.6.1 INTEGRATE OPERATIONAL INFORMATION OPERATIONS

OP 5.6.2 DELETED - PLAN AND INTEGRATE OPERATIONAL C2W

OP 5.6.3 CONTROL INFORMATION OPERATIONS

OP 5.7 COORDINATE and INTEGRATE JOINT/MULTINATIONAL and
INTERAGENCY SUPPORT

OP 5.7.1 ASCERTAIN NATIONAL OR AGENCY AGENDA

OP 5.7.2 DETERMINE NATIONAL/AGENCY CAPABILITIES and
LIMITATIONS

OP 5.7.3 DEVELOP MULTINATIONAL INTELLIGENCE/INFORMATION
SHARING STRUCTURE

OP 5.7.4 COORDINATE PLANS WITH NON-DOD ORGANIZATIONS

OP 5.7.5 COORDINATE HOST-NATION SUPPORT

OP 5.7.6 COORDINATE COALITION SUPPORT

OP 5.7.7 CONDUCT CIVIL ADMINISTRATION OPERATIONS

OP 5.7.8 COORDINATE CONSEQUENCE MANAGEMENT IN THE JOINT
OPERATIONS AREA

OP 5.8 PROVIDE PUBLIC AFFAIRS IN THE JOINT OPERATIONS AREA

OP 5.8.1 MANAGE MEDIA RELATIONS IN THE JOINT OPERATIONS
AREA

OP 5.8.2 COORDINATE COMMAND/INTERNAL INFORMATION
PROGRAMS IN THE JOINT OPERATIONS AREA

OP 5.8.3 CONDUCT COMMUNITY RELATIONS PROGRAMS IN THE
JOINT OPERATIONS AREA

TA 5. EXERCISE COMMAND AND CONTROL -- To exercise authority and direction
over assigned or attached forces in the accomplishment of a mission. C2 involves
maintaining visibility over and arranging personnel, equipment, and facilities during the

planning and conducting of military operations.TA 5.2.1 ESTABLISH, OPERATE AND
MAINTAIN BASELINE INFORMATION EXCHANGE

TA 5.5.1 CONDUCT FORCE LINK-UP

TA 5.6 EMPLOY TACTICAL INFORMATION OPERATIONS
CONDITIONS

2.3 COMMAND, CONTROL, AND COMMUNICATIONS

C 2.3.1 COMMAND ARRANGEMENTS

C 2.3.1.1 JOINT STAFF INTEGRATION

C 2.3.1.2 MULTINATIONAL INTEGRATION

C 2.3.1.3 STAFF EXPERTISE

C 2.3.1.4 PRE-EXISTING COMMAND

C 2.3.1.5 COMMAND AUTHORITY

C 2.3.1.6 COMMUNICATIONS CONNECTIVITY

C 2.3.1.7 CLASSIFICATION

C 2.3.1.8 INFORMATION EXCHANGE

C 2.3.1.9 INFORMATION VOLUME

C 2.3.1.10 COMMAND RELATIONSHIPS

C 2.3.1.11 NET-CENTRIC INFORMATION ENVIRONMENT

C 2.3.1.12 BANDWIDTH REQUIRED

C 2.3.1.13 TECHNOLOGY AND ACQUISITION CYCLE TIME

C 2.3.2 MILITARY STYLE

C 2.3.2.1 LEADERSHIP STYLE

C 2.3.2.2 FORCE EMPHASIS

C 2.3.2.3 FLEXIBILITY OF WARFARE STYLE

C 2.3.2.4 COMPONENT HEADQUARTERS LOCATION

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14. ABSTRACT The <i>Capstone Concept for Joint Operations</i> (CCJO) heads the family of joint operations concepts (JOpsC) that describe how joint forces are expected to operate across the range of military operations in 2012–2025. Its purpose is to lead force development and employment primarily by providing a broad description of how the future joint force will operate. Joint Publication 0-2, <i>Unified Action Armed Forces (UNAAF)</i> , asserts without qualification that “joint command and control ... is the most important function undertaken by a JFC.” Therefore, how command and control is discussed in the CCJO also is extremely important. The IDA study team evaluated the CCJO and several concepts subordinate to the CCJO; reviewed current doctrine, operations, planning and activities; examined advanced theoretical work; and examined selected DARPA work and ongoing activities at JFCOM, all in regard to their treatment of command and control. The results led to the conclusion that greater clarity regarding future joint command and control is needed in the CCJO. The report recommends ways to improve the discussion of command and control in the CCJO, as well as several concrete options for possible inclusion in a future document revision.					
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